AMERICAN SCHOOL AND UNIVERSITY 1955-56

VOLUME 27

AMERICAN SCHOOL PUBLISHING CORP.
470 FOURTH AVENUE NEW YORK 16, N. Y.

LB
3205
.A512

About this yearbook

This edition of the AMERICAN SCHOOL AND UNIVERSITY is the 27th consecutive volume in the series. The primary purpose of these yearbooks is to present important materials on the planning, designing, equipping, maintenance and operation of educational buildings. Each edition of the yearbook is complete in itself, and endeavors to present the best current thinking, practice, research and product material information regarding educational buildings. Also, each edition is related to the preceding ones in the series. The cumulative indexes assist the reader to locate materials easily in this and former volumes. May I suggest that you arrange to keep all the volumes of the yearbook together in one place so that they are readily available.

Walter D. Cocking, Editor

PUBLISHED BY

AMERICAN SCHOOL PUBLISHING CORPORATION, NEW YORK

Edgar J. Buttenheim
Chairman, Board of Directors

Prentice C. Ford President	**Walter D. Cocking** Editor	**N. L. Engelhardt, Sr.** Consulting Editor
Frank J. Raymond Vice-President	**Georgette N. Manla** Associate Editor	**Helen E. Weyl** Production Manager
Edwin Wagner Treasurer	**Karl T. Hereford** Associate Editor	**Natalie P. Bonis** Circulation Manager
Frank H. Laavy Advertising Manager	**Henry E. Salloch** Art Director	**Thomas Morrison** Catalog Service Manager

Copyright, 1955, by American School Publishing Corp. $7.00 per copy

TABLE OF CONTENTS

Page

Cumulative Index by Authors (Volumes XXIII through XXVII) 6

Cumulative Index by Subject Classification (Volumes XXIII through XXVII) 12

Index to Advertisers 17

Manufacturers' Products Index 21

Distributors' Directory 43

Editorial Section 65–472

Educational Building in 1954 65
by The Editors, *American School and University*

1954 Competition for Better School Design 73
by Georgette N. Manla, *Associate Editor, American School and University*

Human Values in School Architecture 113
by John Lyon Reid, *Architect, John Lyon Reid and Partners, San Francisco, California*

School and Municipal Relationships in Overall Community Planning 117
by A. Benjamin Handler, *Associate Professor of Planning, University of Michigan, Ann Arbor, Michigan*

Significant Trends in State and Federal Support for School Buildings 123
by R. L. Johns, *Head of the Department of School Administration, University of Florida, Gainesville*

Budgets for School Building Programs 127
by N. L. Engelhardt, Sr., *Engelhardt, Engelhardt and Leggett, Educational Consultants, New York City*

Units of Cost for Comparing School Buildings 133
by Alonzo J. Harriman, *Alonzo J. Harriman, Inc., Architects-Engineers, Auburn, Maine*
and Paul P. Wheeler, *Alonzo J. Harriman, Inc., Architects-Engineers, Auburn, Maine*

Considerations in Selecting a School Architect 139
by Harold Silverthorn, *Consultant in School Building Facilities, State Department of Public Instruction, Olympia, Washington*

An Architect Views the Client's Role in School Building Planning 145
by Robert E. Alexander, *Richard J. Neutra and Robert E. Alexander, Architects, Los Angeles, California*

Consultative Services Required in Planning School Buildings 149
by Cyril G. Sargent, *Professor of Education and Director, Center for Field Studies, Graduate School of Education, Harvard University*
and Donald P. Mitchell, *Director, Division of Field Services and Research, and Associate Professor, School of Education, Rutgers University*

School Plant Consultative Services for the Local School District 153
by Robert L. Hopper, *Professor of Education and Director, Bureau of Research and Service, School of Education, Michigan State College, East Lansing*
and Donald J. Leu, *Assistant Professor of Education and School Plant Consultant, School of Education, Michigan State College*

Unit Planning for Wilbert Snow Elementary School 157
by Creighton F. Magoun, *Superintendent of Town Schools, Middletown, Connecticut*
and Warren H. Ashley, *Architect, AIA, West Hartford, Connecticut*

Thomy Lafon—The School on Stilts 161
by James F. Redmond, *Superintendent, New Orleans Public Schools, New Orleans, Louisiana*

For Rumson, New Jersey—A Three-Fold School 165
by Charles A. Wolbach, *Superintendent of Schools, Rumson, New Jersey*
and Jay C. Van Nuys, *Jay C. Van Nuys and Associates, Architects, Somerville, New Jersey*

Highlands Elementary School in Millbrae, California 169
by Earl R. Kuhn, *Superintendent, Millbrae Elementary School District, Millbrae, California*

East Whittier School District Office and Warehouse 173
by William Henry Taylor, *Architect, Pasadena, California*
and Roscoe L. Warren, *Architect, Whittier, California*

Self-Contained Classrooms Make the Grade 177
by Ralph W. Cherry, *Professor of Educational Administration, University of Texas, Austin*

Selection of Equipment in Elementary Schools 181
by David S. Brainerd, *Principal, Edward L. Brown and Boulevard Schools, Denver, Colorado*

Page

Secondary School Design Since World War II 185
by Walter D. Cocking, *Editor, American School and University*

Adolescents and Their Schools 193
by Robert E. Bills, *Associate Professor of Psychology, University of Kentucky, Lexington, Kentucky*
and Robert L. Hopper, *Director, Bureau of Research and Service, Michigan State College, East Lansing*

Changing Secondary School Programs and Their Implications for Design 199
by G. Robert Koopman, *Associate Superintendent, Michigan Department of Public Instruction, Lansing*

A High School Designed for the Future 205
by J. Don Garrison, *Superintendent, Norman Schools, Norman, Oklahoma*

Solution for New Secondary Schools—The Campus Plan 209
by Elmer H. Garinger, *Superintendent of Schools, Charlotte, North Carolina*
and John E. French, *Principal, Myers Park High School, Charlotte, North Carolina*

Schenectady, New York, Plans a New High School 215
by Harvey Handel, *Apprentice in Leadership, Public Schools, Schenectady, New York*
and Robert W. Boenig, *Assistant Principal, Riverside School, Schenectady, New York*

Advantages of the Unit Plan for Secondary Schools 219
by Warren H. Ashley, *Architect, AIA, West Hartford, Connecticut*

Keokuk—A Senior High School, Junior College and Community Building 225
by J. C. Wright, *State Superintendent of Public Instruction, Des Moines, Iowa*

A Unit High School for Groton, Connecticut 231
by Elaine Rogers, *Equipment Design Consultant, Office of Warren H. Ashley, West Hartford, Conn.*

Development of a Small Campus-Type High School 235
by William D. Moyle, *Supervising Principal, Edgemont School, Scarsdale, New York*
and Warren H. Ashley, *Architect, West Hartford, Connecticut*

Riverside, California, Plans a New High School 241
by Bruce Miller, *Superintendent of Schools, Riverside, California*

Lynnwood Junior High School in Edmonds, Washington 247
by William Arild Johnson, *Johnson and Botesch, Architects-Engineers, Everett, Washington*
and Harold E. Silvernail, *Superintendent of Schools, Edmonds, Washington*

Selection of Equipment in High Schools 253
by Leo M. Casey, *Assistant Superintendent for Business, Scotia-Glenville Central Schools, Scotia, N. Y.*

Social Living Facilities in High Schools and Colleges 257
by Charles E. Fry, *AIA, Austin, Field and Fry, Architects and Engineers, Los Angeles, California*

A School Library for Books . . . And Children, Too! 261
by Carl Koch, *Carl Koch and Associates, Architects, Cambridge, Massachusetts*

Criteria for High School Library Spaces and Facilities 267
by Raymond G. Erbes, Jr., *Librarian, Reavis High School, Oak Lawn, Illinois; Chairman, Committee on Planning School Library Quarters, American Association of School Librarians, Chicago, Illinois*

Needed Facilities for a Modern Homemaking Program 273
by Ruth C. Cowles, *Consultant, Home Economics Education, Connecticut State Dept. of Education*

Homemaking Spaces for New School Buildings 279
by Stacey Krasnecki, *Head of the Homemaking Department, Senior High School, Great Neck, New York*

Are High School Science Facilities Adequate? 285
by Norman R. Loats, *Principal, Riverview Gardens High School, St. Louis, Missouri*

Facilities for Programs of Arts and Crafts in Secondary Schools: A Symposium 289

Spaces and Equipment for Graphic Arts Instruction 307
by Harold C. Hill, *Graphic Arts Teacher, Durfee Intermediate School, Detroit, Michigan*

Needed: Better Teachers' Facilities 311
by J. Stanley Sharp, *Ketchum, Giná and Sharp, Architects, New York City*

The Planning Requirements of Larger School Sites 315
by Charles A. Currier, *Charles A. Currier and Associates, West Hartford, Connecticut*

Promising Practices in the Educational Planning of New College Buildings 319
by Harvey H. Davis, *Provost, State University of Iowa, Iowa City*
and Leslie G. Moeller, *Director, School of Journalism, State University of Iowa*

Ceramic Engineering Building at Clemson College 327
by G. C. Robinson, *Ceramic Engineering Department, The Clemson Agricultural College, S. C.*

Wayne University's New Library Buildings 331
by Suren Pilafian, *Architect, AIA, Detroit, Michigan*

Page

New Classroom Building for Indiana State Teachers College 337
by Arthur F. Nicholson, *Director, Public Relations Office, State Teachers College, Indiana, Pennsylvania*

Serving the College Community at San Francisco State College 341
by Erna Lehan, *Director of College Food Services, San Francisco State College, San Francisco, California*

New Dormitory for Michigan State Normal College 347
by Benjamin Klager, *Controller, Michigan State Normal College, Ypsilanti, Michigan*

Music Building for Southern University 351
by James L. Hunt, *Superintendent of Maintenance, Southern University, Baton Rouge, Louisiana*

Audio-Visual Teaching Facilities on College and University Campuses 355
by Morton S. Malter, *Associate Professor of Education, Oregon State System of Higher Education, Portland, Oregon*

Selection of Equipment in Colleges 361
by Paul W. Seagers, *Professor of Education and School Building Consultant, Indiana University, Bloomington*

School Building Modernization Programs 365
by Graham R. Miller, *Assistant Superintendent for Business Services, Denver, Colorado, Public Schools*
Carl H. Schoene, *Director of Operation and Maintenance, Denver, Colorado, Public Schools*
and Charles E. Armstrong, Jr., *Director of Planning Services, Denver, Colorado, Public Schools*

Practices in Audio-Visual Education and Services 371
by Alphonse Heningburg, *Director of Audio-Visual Services, West Hempstead Schools, Long Island, New York*

For Today's Classrooms—An Organized Audio-Visual Aids Program 379
by J. V. LaClair, *Director of Instructional Materials, Public Schools, Klamath Falls, Oregon*

Make Room for the Use of Audio-Visual Aids 383
by Earl F. Strohbehn, *Director, Audio-Visual Education and Social Studies, Oak Ridge, Tennessee*

Techniques in the Economical Construction of Educational Buildings 391
by Fred N. Severud, *Severud-Elstad-Krueger, Consultant Engineers, New York City*
and Lessing W. Williams, *Partner, George B. Post and Sons, Architects, New York City*

Developments in Daylighting Schools Since World War II 397
by Domina Eberle Spencer, *Associate Professor, University of Connecticut, Storrs, Connecticut*

Plastic Skydomes Pay Daylighting Dividends 405
by Bernard F. Greene, *Consulting Engineer, New York City*

Heating with High Temperature Water Systems at Rutgers University 409
by Fred L. Moesel, *Mongitore and Moesel, Consulting Engineers, New York, New York*

Research Report No. 4, An Analysis of Two Multi-Purpose Corridor Types 415
by Al Harris, *Superintendent of Schools, Clinton, Oklahoma*
and William W. Caudill, *Caudill, Rowlett, Scott and Associates, Bryan, Texas; Oklahoma City, Oklahoma*

Research Report No. 5, Relationship of Cost to the Geometry of a Building 419
by John M. Rowlett, *Caudill, Rowlett, Scott and Associates, Bryan, Texas; Oklahoma City, Oklahoma*
and Thomas A. Bullock, *Caudill, Rowlett, Scott and Associates, Bryan, Texas; Oklahoma City, Oklahoma*

Research Report No. 6, Implications of Child Growth and Development for School Plant Design 423
by Ralph W. Cherry, *Professor of Educational Administration, University of Texas, Austin*

Research Report No. 7, "Glass Walls" and the Instructional Program 429
by Paul R. Hensarling, *Director of Administrative Research, Port Arthur, Texas, Schools*

A Symposium of Good Maintenance Practices 437

Ten Years of School Bus Transportation 447
by Karl T. Hereford, *Associate Editor, American School and University*

School Plant Bibliography 453
by Dale K. Hayes, *Director of Research, American School Publishing Corporation*

Manufacturers' Catalogs . . . . . following page 472

Structural Materials . . . . . **A**
Interior Finish . . . . . **B**
Heating—Plumbing—Lighting—Electrical . . . . . **C**
Instructional and Administrative . . . . . **D**
Food Service—Homemaking—Dormitory . . . . . **E**
Science—Shops . . . . . **F**
Physical Education—Health . . . . . **G**
Maintenance Products—Buses . . . . . **H**

EDITORIAL INDEX BY AUTHORS

All authors who have contributed to this volume and to the previous four (vol. XXIII, 1951, through vol. XXVII, 1955) are included in the index. Index of articles by subject classification follows on page 12. Complete indexes to vol. XVII, 1945, through vol. XXV, 1953, can be found in vol. XXV, 1953, beginning on page 8. Complete indexes to vol. XI, 1939, through vol. XVI, 1944, are found in vol. XVI, 1944, page 5. Complete indexes to vol. I, 1928, through vol. X, 1938, are to be found in vol. X, 1938, beginning on page 9.

	Volume	Year	Page
Abrams, Leonard N., Planning and Presenting New Schools with Scale Models	XXV	1953	139
Adams, O. D., The John A. O'Connell Vocational and Technical Institute	XXV	1953	201
Aldrich, David, and **Porter-Shirley, Carl**, Modernizing That Old Elementary School Building	XXVI	1954	175
Alexander, Robert E., An Architect Views the Client's Role in School Building Planning	XXVII	1955	145
Anderson, St. Claire, Charleston Looks Ahead	XXV	1953	255
Armstrong, Charles E., Miller, Graham R., and **Schoene, Carl H.**, School Building Modernization Programs	XXVII	1955	365
Armstrong, Leland R., Accounting and Maintenance of Mechanical Equipment (Symposium)	XXIII	1951	359
Ashley, Warren H., Advantages of the Unit Plan for Secondary Schools	XXVII	1955	219
Ashley, Warren H., and **Magoun, Creighton F.**, Unit Planning for Wilbert Snow Elementary School	XXVII	1955	157
Ashley, Warren H., and **Moyle, William D.**, Development of a Small Campus-Type High School	XXVII	1955	235
Bailey, James H., Recommended Equipment for an Industrial Arts Program	XXIII	1951	239
Ball, F. Carleton, Planning the Ceramics Shop	XXV	1953	341
Barkdoll, O. R., Surfacing the Open-Air Gymnasium	XXIII	1951	355
Barthelme, Donald, Top Lighting vs. Side Lighting for School Interiors	XXVI	1954	397
Bauer, Harold C., Renovation in Fond Du Lac, Wisconsin	XXV	1953	359
Bellomy, Cleon C., and **Caudill, W. W.**, Research Report No. 1, The Development of the Teaching Space Divider	XXVI	1954	433
Research Report No. 2, Spatial Approach to Planning the Physical Environment	XXVI	1954	437
Benham, Eugene T., Cowan Hall—Auditorium and Chapel for Otterbein College	XXVI	1954	337
Bennett, Don F., Perimeter Heating	XXIV	1952	385
Bennett, Herschel K., and **Lewis, James A.**, A Unified Arts Program for Junior High Schools	XXVI	1954	153
Benton, Byrl E., Fitch Hall of Pharmacy, Drake University	XXIII	1951	335
Billmyer, Eleanor, At Cornell University: Mann Library and Anabel Taylor Hall	XXVI	1954	323
Bills, Robert E., and **Harris, Fred E.**, Psychological Considerations of Color Selection	XXV	1953	157
Bills, Robert E., and **Hopper, Robert L.**, Adolescents and Their Schools	XXVII	1955	193
Birren, Faber, Put Color to Work	XXIV	1952	355
Blatner, Henry, and **Stephens, Donald J.**, Suggestions for Plumbing and Sanitation in School Buildings	XXVI	1954	415
Blundell, W. Irvin, and **Perkins, Lawrence B.**, The School Auditorium—Its Purpose and Design	XXV	1953	271
Boenig, Robert W., and **Handel, Harvey**, Schenectady, New York, Plans a New High School	XXVII	1955	215
Boyer, Philip A., Modern Facilities at Ellis Country School for Girls	XXVI	1954	283
Brainerd, David S., Selection of Equipment in Elementary Schools	XXVII	1955	181
Brewster, R. Q., and **Stranathan, J. D.**, Science Building at the University of Kansas	XXVI	1954	373
Bromley, R. J., Community Cleanup Campaign (Symposium)	XXIV	1952	412
Brown, Paul B., University of Detroit Library Building	XXIV	1952	271
Bullock, Thomas A., and **Rowlett, John M.**, Relationship of Cost to the Geometry of a Building	XXVII	1955	419
Butler, George D., The School Plant as a Community Recreation Center	XXIII	1951	151
Buttrill, Lee R., A New Negro Junior-Senior High School Designed for the Community	XXIV	1952	255
Cahoon, G. P., Richardson, John S., and **Lefler, Ralph W.**, Facilities for Science Teacher Education	XXIV	1952	299
Cameron, John L., Shrubbery for School Sites	XXV	1953	313
Carlock, James, Economy Through Insulation	XXIV	1952	325
Carroll, Charles F., New Administration Building for High Point Public Schools	XXIV	1952	263
Carter, James S., Selecting School Insurance Coverage	XXV	1953	363
Casey, Leo M., Selection of Equipment in High Schools	XXVII	1955	253

	Volume	Year	Page
Caudill, Rowlett, Scott and Associates, Research Reports	XXV	1953	391
Caudill, W W., and Bellomy, Cleon C., Research Report No. 1, The Development of the Teaching Space Divider	XXVI	1954	433
Research Report No. 2, Spatial Approach to Planning the Physical Environment	XXVI	1954	437
Caudill, William W., and Harris, Al, An Analysis of Two Multi-Purpose Corridor Types	XXVII	1955	415
Caudill, W. W., and Reed, Bob H., Classrooms that Perform	XXIV	1952	327
Caudill, W. W., and Richardson, L. S., Research Report No. 3, Towards an Economical Flexibility	XXVI	1954	441
Cherry, Ralph W., Self-Contained Classrooms Make the Grade	XXVII	1955	177
Implications of Child Growth and Development for School Plant Design	XXVII	1955	423
Christensen, W. P., When Building the New School (Symposium)	XXIV	1952	409
Clapp, Wilfred F., Cooperative Planning of School Plants	XXIV	1952	161
Clapp, Wilfred F., and Shaw, Laura V., Essentials of Stage Design for Schools	XXVI	1954	159
Cline E. A., Convection Heating	XXIV	1952	389
Cocking, Walter D. Educational Building in 1950	XXIII	1951	53
Educational Building in 1951	XXIV	1952	65
Educational Building in 1952	XXV	1953	69
School Building Competition	XXIV	1952	77
Secondary School Design Since World War II	XXVII	1955	185
Confer, Frederick L. R., McCunn, Drummond, Warnecke, John Carl, and Livingston, Lawrence, Jr., Planning Contra Costa Junior College	XXIV	1952	241
Conrad, Lawrence H., Television's Role in Education	XXVI	1954	125
Conrad, M. J., A Capacity Formula for Secondary Schools	XXV	1953	141
Cowles, Ruth C., Needed Facilities for a Modern Homemaking Program	XXVII	1955	273
Cross, A. J. Foy, Hyer, Anna, and White, Don, Effective Use of Audio-Visual Aids Through Building Design	XXV	1953	349
Crow, E. R., South Carolina's School Building Program	XXV	1953	161
Cruickshank, William M., Syracuse University Meets the Challenge of the Exceptional Child	XXVI	1954	317
Currier, Charles A., The Planning Requirements of Larger School Sites	XXVII	1955	315
Daniels, Katharine H., A School System Plans for Two New Schools	XXIV	1952	213
Davini, William C., Colors for School Interiors	XXIV	1952	359
Davis, Harvey H., Building Needs and Priorities of a State University	XXV	1953	133
Davis, Harvey H., and Moeller, Leslie G., Promising Practices in the Educational Planning of New College Buildings	XXVII	1955	319
DeMarco, Norman, University Fine Arts Center	XXV	1953	185
Demarest, William, Jr., Economy by Modular Coordination	XXIV	1952	170
de Shaw, Alton R., Planning the School Grounds	XXIII	1951	217
Dillon, John P., Davidson College Presbyterian Church	XXVI	1954	393
Donaldson, George, Facilities for School Camping	XXIV	1952	417
Douglas, Mary Peacock, A Library for Tomorrow's Secondary School	XXV	1953	329
Early, Doyt, Use of Precast Concrete in School Construction	XXVI	1954	419
Early, William A., School Buildings Can Be Waterproof	XXIII	1951	349
Eckel, Howard, Features of Outstanding Classrooms	XXIII	1951	143
Selected Bibliography on the School Plant	XXIII	1951	371
Egdorf, McDonald F., and Smith, R. Jackson, A Secondary School for Garden City	XXVI	1954	237
Elliot, Eugene B., A New Power Plant for Michigan State Normal College	XXIII	1951	347
Ellsworth, R. E., The New Library of the State University of Iowa	XXIII	1951	339
Engelhardt, N. L., Budgets for School Building Programs	XXVII	1955	127
Flow Charts of School Building Planning	XXVI	1954	117
Planning School Administration Centers	XXV	1953	319
School Building Problems of Large City School Districts	XXIII	1951	125
The School Building Problems of Suburban Communities	XXV	1953	129
The Sunset Community Center of San Francisco	XXIV	1952	191
Engelhardt, Jr., N. L., The Impact of Population Trends on Long-Range Planning	XXV	1953	149
Laboratories for Learning	XXVI	1954	135
Revelations in Planning School Building Programs	XXIII	1951	117
Erbes, Jr., Raymond G., Criteria for High School Library Spaces and Facilities	XXVII	1955	267
Essex, Don L., State Regulations on Heating and Ventilating	XXIV	1952	377
Etkes, Asher B., Putting Across a School Bond Issue	XXV	1953	175
Featherston, E. Glenn, Developments in School Transportation	XXVI	1954	461
Recent Developments in Pupil Transportation	XXIII	1951	368
Feinberg, D. E., Water-Saving Methods of Air Conditioning	XXIII	1951	353
Fly, Murry, and Groos, F. Delmar, Odessa College	XXIII	1951	330
Fogg, Walter F., Staff Planning for Scarsdale's Junior High School	XXVI	1954	121
Fox, John F., Punahou Elementary School in Honolulu	XXVI	1954	213
Francis, Helen D., Applied Arts Building, Fort Hays Kansas State College	XXVI	1954	379
Freeman, M. Herbert, Equipment for a Basic Business Education Course	XXVI	1954	141
French, John E., and Garinger, Elmer H., Solution for New Secondary Schools—The Campus Plan	XXVII	1955	209
Fry, Charles E., Social Living Facilities in High Schools and Colleges	XXVII	1955	257

	Volume	Year	Page
Fulmer, O. Kline, How to Build a Low Cost School	XXIII	1951	221
Garinger, Elmer H., Five New Elementary Schools in Charlotte, North Carolina	XXVI	1954	201
Garinger, Elmer H., and **French, John E.,** Solution for New Secondary Schools—The Campus Plan	XXVII	1955	209
Garnsey, Julian E., Decorations for School Interiors	XXV	1953	309
Garrison, J. Don, A High School Designed for the Future	XXVII	1955	205
George, N. L., and **Heckler, Ruth,** A Community Social Center	XXIII	1951	303
Gibson, Charles D., and **Sampson, Foster K.,** School Lighting Progress to Date and Some Suggested Next Steps	XXIII	1951	173
Girard, David D., and **Vail, Frank L.,** Why the Flexible Shop?	XXIII	1951	235
Greene, Bernard F., Plastic Skydomes Pay Daylighting Dividends	XXVII	1955	405
Groos, F. Delmar, and **Fly, Murry,** Odessa College	XXIII	1951	330
Gruzen, B. Sumner, Design for Schools	XXIII	1951	283
School Design in-the-Round	XXVI	1954	247
Guenther, Carl F., Educational Consultants—Their Functions and Work	XXVI	1954	113
Hamilton, Brooks W., Memorial Union for University of Maine Student Activities	XXVI	1954	341
Hammel, Richard F., and **South, M. L.,** Building a Laboratory School	XXIII	1951	265
Handel, Harvey, and **Boenig, Robert W.,** Schenectady, New York, Plans a New High School	XXVII	1955	215
Handler, A. Benjamin, School and Municipal Relationships in Overall Community Planning	XXVII	1955	117
Hanle, Robert, Engineering for Sound Control in School Buildings	XXVI	1954	401
Hansen, John E., Designing School Libraries	XXIV	1952	275
Harden, Edgar L., Design and Program of Kellogg Center	XXV	1953	193
Harriman, Alonzo J., and **Wheeler, Paul P.,** Units of Cost for Comparing School Buildings	XXVII	1955	133
Harris, Al, and **Caudill, William W.,** An Analysis of Two Multi-Purpose Corridor Types	XXVII	1955	415
Harris, Fred E., and **Bills, Robert E.,** Psychological Considerations of Color Selection	XXV	1953	157
Hart, Frank W., Needed Research in College and University Plant Use and Plant Planning	XXIII	1951	121
Hayes, Dale K., School Plant Bibliography	XXVII	1955	453
Heckler, Ruth, and **George, N. L.,** A Community Social Center	XXIII	1951	303
Heningburg, Alphonse, Practices in Audio-Visual Education and Services	XXVII	1955	371
Hensarling, Paul R., "Glass Walls" and the Instructional Program	XXVII	1955	429
Hereford, Karl T., School Plant Bibliography	XXV	1953	411
Ten Years of School Bus Transportation	XXVII	1955	447
Herrington, L. P., Effect of Thermal Environment on Human Action	XXIV	1952	367
Hertzka, Wayne S., Lynchburg Builds a High School	XXIII	1951	299
New Anza Elementary School of San Francisco	XXV	1953	239
Hewitt, Carter E., and **Murray, L. D.,** South Peoria Builds a High School	XXVI	1954	273
Hiatt, Hugh W., Toilet Provisions in Elementary Schools	XXVI	1954	409
High, John B., Cooperation for Better Maintenance (Symposium)	XXIV	1952	411
Hill, Frederick W., and **Rothmann, Alfred A.,** Group Planning of Southeast Yonkers Junior-Senior High School	XXV	1953	245
Hill, Harold C., Spaces and Equipment for Graphic Arts Instruction	XXVII	1955	307
Hinely, Willie H., The Arts and Crafts Shop	XXV	1953	335
Holmes, George W., III, Do's and Dont's for Planning the School Plant	XXIV	1952	143
Educational Use of Corridor Space	XXV	1953	291
Holzapfel, W. F., Safe Floors—At Last! (Symposium)	XXIII	1951	366
Hopper, Robert L., and **Bills, Robert E.,** Adolescents and Their Schools	XXVII	1955	193
Hopper, Robert L., and **Leu, Donald J.,** School Plant Consultative Services for the Local School District	XXVII	1955	153
Howland, Richard L., Planning Adequate Space for the Custodian	XXIV	1952	293
Hunt, James L., Music Building for Southern University	XXVII	1955	351
Hutchins, Robert S., The Julia Rogers Library of Goucher College	XXVI	1954	329
Hyer, Anna, Cross, A. J. Foy, and **White, Don,** Effective Use of Audio-Visual Aids Through Building Design	XXV	1953	349
Irvin, Nell M., Medical Research Building, Emory University	XXVI	1954	367
Johns, R. L., Significant Trends in State and Federal Support for School Buildings	XXVII	1955	123
Johnson, Kermit A., Selecting the Supervisor of Transportation	XXIV	1952	413
Johnson, William Arild, Centralia Junior College Administration Building	XXIV	1952	267
Ketchikan, Alaska, High School	XXV	1953	251
Johnson, William Arild, and **Silvernail, Harold E.,** Lynnwood Junior High School in Edmonds, Washington	XXVII	1955	247
Juckett, Edwin A., A Community Studies Its School Plant Problems	XXIII	1951	93
Kellogg, Wendell, Engineering-Technology Building to Aid University's Community Program	XXIII	1951	343
Ketchum, Jr., Morris, Multiple-Use Corridors	XXV	1953	303
Kirby, Donald Beach, and **Mulvin, Thomas B.,** The Katherine Delmar Burke School in San Francisco	XXIII	1951	279
Klager, Benjamin, New Dormitory for Michigan State Normal College	XXVII	1955	347
Knezevich, Stephen J., Can School Districts Finance School Plant Projects?	XXIV	1952	165
Koch, Carl, A School Library for Books			

	Volume	Year	Page
. . . and Children, Too!	XXVII	1955	261
Kohler, Mary, Equipping the Homemaking Suite	XXVI	1954	163
Koopman, G. Robert, Changing Secondary School Programs and Their Implications for Design	XXVII	1955	199
Krasnecki, Stacey, Homemaking Spaces for New School Buildings	XXVII	1955	279
Kraushar, Carl, Why Not Start a Merchandising Laboratory	XXIV	1952	289
Kuhn, Earl R., Highlands Elementary School in Millbrae, California	XXVII	1955	169
La Clair, J. V., For Today's Classrooms —An Organized Audio-Visual Aids Program	XXVII	1955	379
Lambert, A. C., Defining Limits for Free School Transportation Service	XXV	1953	383
Lanza, Anthony R., Tape Recording in the Classroom	XXVI	1954	131
Larke, George, Cumulative Record for School Plants	XXVI	1954	449
Lawson, Dorothy S., Planning the Homemaking Department: A Modern Concept	XXIII	1951	165
Lefler, Ralph W., Richardson, John S., and **Cahoon, G. P.,** Facilities for Science Teacher Education	XXIV	1952	299
Leggett, Stanton, Careful School Planning Will Nurture Responsibility and Leadership in Youth (Symposium)	XXIV	1952	136
An "H-Bomb" Plant Hits a School System	XXV	1953	169
Planning New High Schools	XXIV	1952	219
Trends in Educational Spaces in Junior High Schools	XXVI	1954	219
Lehan, Erna, Serving the College Community at San Francisco State College	XXVII	1955	341
Leu, Donald J., and **Hopper, Robert L.,** School Plant Consultative Services for the Local School District	XXVII	1955	153
Lewis, James A., and **Bennett, Herschel K.,** A Unified Arts Program for Junior High Schools	XXVI	1954	153
Linn, H. H., Modernizing School Buildings	XXIV	1952	401
Livingston, Lawrence, Jr., McCunn, Drummond J., Confer, Frederick L. R., and **Warnecke, John Carl,** Planning Contra Costa Junior College	XXIV	1952	241
Loats, Norman R., Are High School Science Facilities Adequate?	XXVII	1955	285
MacKinnon, Robert D., Darien Builds a Junior High School	XXIV	1952	199
Magoun, Creighton F., and **Ashley, Warren H.,** Unit Planning for Wilbert Snow Elementary School	XXVII	1955	157
Mallwitz, William, We Reduced Dust on Our Concrete Floors (Symposium)	XXIV	1952	406
Malter, Morton S., Audio-Visual Teaching Facilities on College and University Campuses	XXVII	1955	355
Manla, Georgette N., Competition for Better School Design	XXV	1953	77
1953 Competition for Better School Design	XXVI	1954	75
1954 Competition for Better School Design	XXVII	1955	73
Mansell, T. Norman, A School for Tomorrow's Needs	XXIV	1952	205
McClurkin, W. D., The National Council on Schoolhouse Construction: Its Origin and Work	XXIV	1952	115
McCunn, Drummond J., Warnecke, John Carl, Confer, Frederick L. R., and **Livingston, Lawrence, Jr.,** Planning Contra Costa Junior College	XXIV	1952	241
McLean, Mary, Relation of School Plant Planning to Total Community Planning	XXV	1953	109
McLeod, John W., Where Does the Corridor Go From Here?	XXV	1953	297
McManus, John F., Cornell's New Engineering Materials Laboratory	XXIV	1952	321
Miller, Bruce, Riverside, California, Plans a New High School	XXVII	1955	241
Miller, Graham R., Armstrong, Charles E., and **Schoene, Carl H.,** School Building Modernization Programs	XXVII	1955	365
Miller, Ward I., A New Atmosphere Is Needed to Promote Education for Life Adjustment (Symposium)	XXIV	1952	139
Mills, Charles L., and **Standhardt, Frank W.,** Hobbs, New Mexico, Plans a Secondary School	XXVI	1954	241
Mills, David O., Flexible Interiors for an Applied Arts Building	XXV	1953	287
Mitchell, Donald P., and **Sargent, Cyril G.,** Consultative Services Required in Planning School Buildings	XXVII	1955	149
Moeller, Leslie G., and **Davis, Harvey H.,** Promising Practices in the Educational Planning of New College Buildings	XXVII	1955	319
Moench, Francis J., Physical Education Equipment for the Modern School Plant	XXIII	1951	241
Moesel, Fred L., Heating with High Temperature Water Systems at Rutgers University	XXVII	1955	409
Morphet, Edgar L., and **Reller, Theodore L.,** The State's Function in Financing Schools	XXIII	1951	65
Morrow, Robert D., and **Vesey, Francis A.,** A Look at Tucson's Schools	XXIII	1951	244
Moyle, William D., and **Ashley, Warren H.,** Development of a Small Campus-Type High School	XXVII	1955	23
Mulvin, Thomas B., and **Kirby, Donald Beach,** The Katherine Delmar Burke School in San Francisco	XXIII	1951	279
Murray, L. D., and **Hewitt, Carter E.,** South Peoria Builds a High School	XXVI	1954	273
Nelson, Thomas L., Berkeley's New "Temple of Beauty"	XXIII	1951	231
Nesbitt, Albert J., Unit Systems	XXIV	1952	395
Nicholson, Arthur F., New Classroom Building for Indiana State Teachers College	XXVII	1955	337
Parkinson, B. L., and **Rosamond, William I.,** Classroom Building for Women's State College	XXIII	1951	327
Part, Anthony, Postwar School Building in England and Wales	XXIII	1951	83
U.S. School Buildings as I See Them	XXIV	1952	101
Payne, Harry D., New Elementary Schools Along the Texas Gulf Coast	XXVI	1954	181
Pearson, Arthur G., and **Redmond,**			

	Volume	Year	Page
James F., Purchasing School Supplies in a Big City System	XXV	1953	373
Peitsch, H. A., Warm Air Systems	XXIV	1952	379
Perkins, Lawrence B., How to Design Livable Schools	XXIV	1952	147
Perkins, Lawrence B., and **Blundell, W. Irvin**, The School Auditorium—Its Purpose and Design	XXV	1953	271
Pilafian, Suren, Wayne University's New Library Buildings	XXVII	1955	331
Pitkin, Edgar S., How Three Architects Met North Colonie's Elementary School Needs	XXV	1953	259
Place, Kenneth E., Economy in Maintenance, Repairs and Alterations (Symposium)	XXIII	1951	365
Porter-Shirley, Carl, and **Aldrich, David**, Modernizing That Old Elementary School Building	XXVI	1954	175
Postley, Maurice G., Public Relations for Architects	XXIII	1951	79
Quinn, William A., A Comprehensive Guide to Use of THE AMERICAN SCHOOL AND UNIVERSITY	XXV	1953	407
Redmond, James F., Thomy Lafon—The School on Stilts	XXVII	1955	161
Redmond, James F., and **Pearson, Arthur G.**, Purchasing School Supplies in a Big City System	XXV	1953	373
Reed, Bob H., and **Caudill, W. W.**, Classrooms That Perform	XXIV	1952	327
Reid, John Lyon, Changing Educational Policies Will Demand a New Kind of High School Building (Symposium)	XXIV	1952	127
A High School That Wants to Stay Young	XXVI	1954	229
How to Project Bright Pictures in Bright Classrooms	XXIII	1951	191
Human Values in School Architecture	XXVII	1955	113
Reller, Theodore L., Proposed Research Institutes in School Plant Planning	XXVI	1954	425
Reller, Theodore L., and **Morphet, Edgar L.**, The State's Function in Financing Schools	XXIII	1951	65
Richardson, John S., Cahoon, G. P., and **Lefler, Ralph W.**, Facilities for Science Teacher Education	XXIV	1952	299
Richardson, Joseph P., Dormitories for Wellesley College	XXVI	1954	355
Richardson, L. S., and **Caudill, W. W.**, Research Report No. 3, Towards an Economical Flexibility	XXVI	1954	441
Robinson, G. C., Ceramic Engineering Building at Clemson College	XXVII	1955	327
Rodgers, William H., Our Five-Year Custodial Plan (Symposium)	XXIV	1952	407
Rogers, Elaine, A Unit High School for Groton, Connecticut	XXVII	1955	231
Rosamond, William I., and **Parkinson, B. L.**, Classroom Building for Women's State College	XXIII	1951	327
Rothmann, Alfred A., and **Hill, Frederick W.**, Group Planning of Southeast Yonkers Junior-Senior High School	XXV	1953	245
Royston, Robert, Landscaping the School Site	XXIV	1952	259
Rowlett, John M., and **Bullock, Thomas A.**, Relationship of Cost to the Geometry of a Building	XXVII	1955	419
Saarinen, Eero, and **Associates**, Planning the Campus of Brandeis University	XXIII	1951	313
Sampson, Foster K., and **Gibson, Charles D.**, School Lighting Progress to Date and Some Suggested Next Steps	XXIII	1951	173
Sargent, Cyril G., and **Mitchell, Donald P.**, Consultative Services Required in Planning School Buildings	XXVII	1955	149
Saunders, Carleton M., School Bonding Limitations	XXV	1953	369
Schoene, Carl H., Miller, Graham R., and **Armstrong, Charles E.**, School Building Modernization Programs	XXVII	1955	365
Scott, Walter Lane, Arkansas' New Teacher-Training School	XXIII	1951	275
Seagers, Paul W., Selection of Equipment in Colleges	XXVII	1955	361
What About New Materials?	XXIV	1952	351
Seaton, Don Cash, Arrangement of Courts on Gymnasium Floors	XXIII	1951	157
Severud, Fred N., and **Williams, Lessing Whitford**, Engineering Solutions to Structural Design	XXV	1953	145
Techniques in the Economical Construction of Educational Buildings	XXVII	1955	391
Sharp, Howard M., From Daylight to Darkness: Current Claims about School Lighting	XXIII	1951	185
Sharp, Stanley, The Darien School: How an Architect Helps a Community to Determine Its School Plant Needs	XXIII	1951	105
Needed: Better Teachers' Facilities	XXVII	1955	311
Shaw, Archibald B., Trends in Multi-Purpose Rooms	XXIV	1952	279
Shaw, Laura V., and **Clapp, Wilfred F.**, Essentials of Stage Design for Schools	XXVI	1954	159
Shideler, Fred M., Animal Industries Building at Oregon State College	XXVI	1954	385
Shultz, Bennie, A Central Chilled Water Air Conditioning Plant for the University of Oklahoma	XXVI	1954	389
Silvernail, Harold E., and **Johnson, William Arild**, Lynnwood Junior High School in Edmonds, Washington	XXVII	1955	247
Silverthorn, Harold, Considerations in Selecting a School Architect	XXVII	1955	139
Small, Ben John, Suggestions for Writing Architectural Specifications	XXV	1953	181
Smith, Benjamin Lee, A Unit Type High School Twenty-Five Years Later	XXV	1953	165
Smith, Donovan E., College and University Space Requirements	XXVI	1954	287
Smith, R. Jackson, School and College Swimming Pools	XXIV	1952	309
Smith, R. Jackson, and **Egdorf, McDonald F.**, A Secondary School for Garden City	XXVI	1954	237
Speers, George A., Library Building—Northeastern University	XXVI	1954	333
Spencer, Domina Eberle, Developments in Daylighting Schools Since World War II	XXVII	1955	397
Stack, Dorr, School Transportation—A Look Ahead	XXV	1953	387
Standhardt, Frank W., and **Mills, Charles L.**, Hobbs, New Mexico, Plans a Secondary School	XXVI	1954	241

	Volume	Year	Page
Stephens, Donald J., and **Blatner, Henry**, Suggestions for Plumbing and Sanitation in School Buildings	XXVI	1954	415
Stingle, Howard A., How Organization of Shop Facilities Saved Money and Time on Desk Refinishing (Symposium)	XXIII	1951	360
Stoner, George H., New Concepts in Planning the School Site	XXV	1953	153
Stott, Frederic A., Phillips Academy's War Memorial Gymnasium	XXVI	1954	267
Stout, M. W., Utilize the Teaching Staff in Planning a Functional High School Building (Symposium)	XXIV	1952	133
Stout, M. W., and **Hammel, Richard F.**, Building a Laboratory School ...	XXIII	1951	265
Stranathan, J. D., and **Brewster, R. Q.**, Science Building at the University of Kansas	XXVI	1954	373
Strohbehn, Earl F., Make Room for the Use of Audio-Visual Aids	XXVII	1955	383
Strozier, Robert M., The Educational Planning of Student Housing	XXIII	1951	135
Stuhr, Robert L., Drake University's New Residence Halls	XXVI	1954	351
Sullivan, J. Graham, Successful High School Planning Must Extend Beyond the Classroom (Symposium) ..	XXIV	1952	130
Taylor, Jack C., At University of Missouri: Student Union Memorial for Two Wars	XXVI	1954	345
Taylor, Leon M., Trinity University Stampedes High Cost of Building ..	XXIV	1952	177
Taylor, William Henry and **Warren, Roscoe L.**, East Whittier School District Office and Warehouse	XXVII	1955	173
Thomas, Orpha Mae, Planning the School Lunchroom	XXIV	1952	285
Thompson, Ronald B., Whither College Enrollments?	XXIII	1951	131
Thorshov, Roy Norman, The Philosophy Behind Richfield's Central Elementary School	XXIII	1951	291
Vail, Frank L., and **Girard, David D.**, Why the Flexible Shop?	XXIII	1951	235
Van Leer, Blake R., Faculty-Designed School of Architecture Building, Georgia Institute of Technology ...	XXVI	1954	361
Van Nuys, Jay C., The Architect and the Tailor-Made School	XXIII	1951	139
Evolution of a School Building Design	XXIV	1952	153
A New Jersey Township Banks on Low-Cost Construction	XXIII	1951	257
Van Nuys, Jay C., and **Wolbach, C. A.**, For Rumson, New Jersey—A Three-Fold School	XXVII	1955	165
Van Santvoord, George, Edsel Ford Memorial Library at Hotchkiss School in Connecticut	XXVI	1954	263
Vesey, Francis A., and **Morrow, Robert D.**, A Look at Tucson's Schools	XXIII	1951	244
Vestnys, Wilbert G., From Excavation to Dedication	XXIV	1952	185
Viles, N. E., Materials and Equipment Under the CMP	XXIV	1952	121
Voelcker, Herbert, Daylighting Classrooms by Clerestory	XXIII	1951	225
Waechter, H. H., The School and City and Regional Planning	XXV	1953	119
Warnecke, John Carl California All-Weather Pool	XXV	1953	277
The De Anza Design: An American Heritage Defined	XXVI	1954	253
Warnecke, John Carl, McCunn, Drummond J., Confer, Frederick L. R., and **Livingston, Lawrence, Jr.**, Planning Contra Costa Junior College ..	XXIV	1952	241
Warren, Roscoe L., and **Taylor, William Henry**, East Whittier School District Office and Warehouse	XXVII	1955	173
Webb, C. W., Bungalow-Schools for El Paso	XXV	1953	267
Westby, Cleve O., New Jersey Prepares to Meet the Demand for More Teachers	XXVI	1954	297
Wheeler, Paul P., and **Harriman, Alonzo J.**, Units of Cost for Comparing School Buildings	XXVII	1955	133
White, Don, Hyer, Anna, and **Cross, A. J. Foy**, Effective Use of Audio-Visual Aids Through Building Design	XXV	1953	349
White, Ken, Decorating College Buildings	XXIV	1952	363
Whittlesey, Julian, Planning a Modern University	XXIII	1951	307
Williams, Lessing Whitford, and **Severud, Fred N.**, Engineering Solutions to Structural Design	XXV	1953	145
Techniques in the Economical Construction of Educational Buildings .	XXVII	1955	391
Wolbach, C. A., and **Van Nuys, Jay C.**, For Rumson, New Jersey—A Three-Fold School	XXVII	1955	165
Wright, Henry L., Classroom Heating and Ventilating .	XXIII	1951	197
A Centralized Kitchen for School Lunch Programs	XXVI	1954	169
Wright, J. C., Keokuk—A Senior High School, Junior College and Community Building	XXVII	1955	225
Wright, Welcome E., Planning School Shop Facilities	XXVI	1954	145

EDITORIAL INDEX BY SUBJECT CLASSIFICATION

The subject index includes all articles in the present volume and those for the four preceding years (vol. XXIII, 1951, through vol. XXVII, 1955). Complete indexes to vol. XVII, 1945, through vol. XXV, 1953, can be found in vol. XXV, 1953, beginning on page 8. Complete indexes to vol. XI, 1939, through vol. XVI, 1944, are to be found in vol. XVI, 1944, on page 5. Indexes to vol. 1, 1928, through vol. X, 1938, are located in vol. X, 1938, on page 9.

	Volume	*Year*	*Page*
ACOUSTICS			
Engineering for Sound Control in School Buildings	XXVI	1954	401
ADMINISTRATIVE OFFICES			
East Whittier School District Office and Warehouse	XXVII	1955	173
New Administration Building for High Point Public Schools	XXIV	1952	263
Planning School Administration Centers	XXV	1953	319
ARCHITECTS			
An Architect Views the Client's Role in School Building Planning	XXVII	1955	145
Architect and the Tailor-Made School	XXIII	1951	139
Architectural Firms Which Have Designed One or More School Buildings Since 1945	XXIII	1951	387
Considerations in Selecting a School Architect	XXVII	1955	139
Public Relations for Architects	XXIII	1951	79
Suggestions for Writing Architectural Specifications	XXV	1953	181
ARTS AND CRAFTS			
Arts and Crafts Shop	XXV	1953	335
Facilities for Programs of Arts and Crafts in Secondary Schools: A Symposium	XXVII	1955	289
Planning the Ceramics Shop	XXV	1953	341
University Fine Arts Center	XXV	1953	185
AUDIO-VISUAL FACILITIES			
Audio-Visual Teaching Facilities on College and University Campuses	XXVII	1955	355
Effective Use of Audio-Visual Aids Through Building Design	XXV	1953	349
For Today's Classrooms—An Organized Audio-Visual Aids Program	XXVII	1955	379
How to Project Bright Pictures in Bright Classrooms	XXIII	1951	191
Make Room for the Use of Audio-Visual Aids	XXVII	1955	383
Practices in Audio-Visual Education and Services	XXVII	1955	371
Tape Recording in the Classroom	XXVI	1954	131
Television's Role in Education	XXVI	1954	125
AUDITORIUM AND STAGE			
Cowan Hall—Auditorium and Chapel for Otterbein College	XXVI	1954	337
Essentials of Stage Design for Schools	XXVI	1954	159
School Auditorium—Its Purpose and Design	XXV	1953	271
BIBLIOGRAPHIES			
School Plant Bibliography	XXV	1953	411
School Plant Bibliography	XXVII	1955	453
Selected Bibliography on the School Plant	XXIII	1951	371
BUILDING NEEDS			
Building Needs and Priorities of a State University	XXV	1953	133
Needed: Better Teachers' Facilities	XXVII	1955	311
BUSINESS EDUCATION			
Equipment for a Basic Business Education Course	XXVI	1954	141
BUSINESS PRACTICES			
Purchasing School Supplies in a Big City System	XXV	1953	373

	Volume	Year	Page
COMMUNITY PLANT PLANNING			
Community Social Center	XXIII	1951	303
Darien School: How an Architect Helps a Community to Determine Its School Plant Needs	XXIII	1951	105
A New Negro Junior-Senior High School Designed for the Community	XXIV	1952	255
School and City and Regional Planning	XXV	1953	119
School and Municipal Relationships in Overall Community Planning	XXVII	1955	117
School Plant as a Community Recreation Center	XXIII	1951	151
Sunset Community Center of San Francisco	XXIV	1952	191
CONSTRUCTION TECHNIQUES			
Techniques in the Economical Construction of Educational Buildings	XXVII	1955	391
Use of Precast Concrete in School Construction	XXVI	1954	419
CONTEMPORARY DESIGN IN SCHOOL AND COLLEGE BUILDINGS			
Animal Industries Building at Oregon State College	XXVI	1954	385
Arkansas' New Teacher-Training School	XXIII	1951	275
At University of Missouri: Student Union Memorial for Two Wars	XXVI	1954	345
Berkeley's New "Temple of Beauty"	XXIII	1951	231
Building a Laboratory School	XXIII	1951	265
Bungalow-Schools for El Paso	XXV	1953	267
Ceramic Engineering Building at Clemson College	XXVII	1955	327
Classroom Building for Women's State College	XXIII	1951	327
1953 Competition for Better School Design	XXVI	1954	75
1954 Competition for Better School Design	XXVII	1955	73
Competition for Better School Design	XXV	1953	77
Darien Builds a Junior High School	XXIV	1952	199
Davidson College Presbyterian Church	XXVI	1954	393
De Anza Design: An American Heritage Defined	XXVI	1954	253
Design and Program of Kellogg Center	XXV	1953	193
Design for Schools	XXIII	1951	283
Designs for Colleges	XXV	1953	219
Development of a Small Campus-Type High School	XXVII	1955	235
Evolution of a School Building Design	XXIV	1952	153
Faculty-Designed School of Architecture Building, Georgia Institute of Technology	XXVI	1954	361
Features of Outstanding Classrooms	XXIII	1951	143
Five New Elementary Schools in Charlotte, North Carolina	XXVI	1954	201
For Rumson, New Jersey—A Three-Fold School	XXVII	1955	165
Group Planning of Southeast Yonkers Junior-Senior High School	XXV	1953	245
"H-Bomb" Plant Hits a School System	XXV	1953	169
Highlands Elementary School in Millbrae, California	XXVII	1955	169
High School Designed for the Future	XXVII	1955	205
High School that Wants to Stay Young	XXVI	1954	229
Hobbs, New Mexico, Plans a Secondary School	XXVI	1954	241
How Three Architects Met North Colonie's Elementary School Needs	XXV	1953	259
John A. O'Connell Vocational and Technical Institute	XXV	1953	201
Katherine Delmar Burke School in San Francisco	XXIII	1951	279
Keokuk—A Senior High School, Junior College and Community Building	XXVII	1955	225
Ketchikan, Alaska, High School	XXV	1953	251
Look at Tucson's Schools	XXIII	1951	244
Lynchburg Builds a High School	XXIII	1951	299
Lynnwood Junior High School in Edmonds, Washington	XXVII	1955	247
Memorial Union for University of Maine Student Activities	XXVI	1954	341
Modern Facilities at Ellis Country School for Girls	XXVI	1954	283
Music Building for Southern University	XXVII	1955	351
New Anza Elementary School of San Francisco	XXV	1953	239
New Elementary Schools Along the Texas Gulf Coast	XXVI	1954	181
New Power Plant for Michigan State Normal College	XXIII	1951	347
Odessa College	XXIII	1951	330
Philosophy Behind Richfield's Central Elementary School	XXIII	1951	291
Postwar School Building in England and Wales	XXIII	1951	83
Punahou Elementary School in Honolulu	XXVI	1954	213
School Building Competition	XXIV	1952	77
School Design in-the-Round	XXVI	1954	247
School for Tomorrow's Needs	XXIV	1952	205
Secondary School for Garden City	XXVI	1954	237
Serving the College Community at San Francisco State College	XXVII	1955	341
South Peoria Builds a High School	XXVI	1954	273
Syracuse University Meets the Challenge of the Exceptional Child	XXVI	1954	317
Thomy Lafon—The School on Stilts	XXVII	1955	161
Trinity University Stampedes High Cost of Building	XXIV	1952	177
Unit High School for Groton, Connecticut	XXVII	1955	231
Unit Planning for Wilbert Snow Elementary School	XXVII	1955	157
Unit Type High School Twenty-Five Years Later	XXV	1953	165
U.S. School Buildings as I See Them	XXIV	1952	101
DECORATION AND COLOR			
Colors for School Interiors	XXIV	1952	359
Decorating College Buildings	XXIV	1952	363
Decorations for School Interiors	XXV	1953	309
Psychological Considerations of Color Selection	XXV	1953	157
Put Color to Work	XXIV	1952	355
DORMITORIES			
Dormitories for Wellesley College	XXVI	1954	355
Drake University's New Residence Halls	XXVI	1954	351

	Volume	Year	Page
Educational Planning of Student Housing	XXIII	1951	135
New Dormitory for Michigan State Normal College	XXVII	1955	347

EQUIPMENT AND SUPPLIES

Materials and Equipment under the CMP	XXIV	1952	121
Selection of Equipment in Colleges	XXVII	1955	361
Selection of Equipment in Elementary Schools	XXVII	1955	181
Selection of Equipment in High Schools	XXVII	1955	253
What About New Materials?	XXIV	1952	351

FINANCE

Can School Districts Finance School Plant Projects?	XXIV	1952	165
Economy by Modular Coordination	XXIV	1952	170
Putting Across a School Bond Issue	XXV	1953	175
School Bonding Limitations	XXV	1953	369
Selecting School Insurance Coverage	XXV	1953	363
Significant Trends in State and Federal Support for School Buildings	XXVII	1955	123
State's Function in Financing Schools	XXIII	1951	65
Units of Cost for Comparing School Buildings	XXVII	1955	133

GROUNDS

Landscaping the School Site	XXIV	1952	259
New Concepts in Planning the School Site	XXV	1953	153
Planning Requirements of Larger School Sites	XXVII	1955	315
Planning the School Grounds	XXIII	1951	217
Shrubbery for School Sites	XXV	1953	313

HEATING AND VENTILATING

Central Chilled Water Air Conditioning Plant for the University of Oklahoma	XXVI	1954	389
Classroom Heating and Ventilating	XXIII	1951	197
Convection Heating	XXIV	1952	389
Effect of Thermal Environment on Human Action	XXIV	1952	367
Heating with High Temperature Water Systems at Rutgers University	XXVII	1955	409
Perimeter Heating	XXIV	1952	385
State Regulations on Heating and Ventilating	XXIV	1952	377
Unit Systems	XXIV	1952	395
Warm Air Systems	XXIV	1952	379
Water-Saving Methods of Air Conditioning	XXIII	1951	353

HOMEMAKING

Equipping the Homemaking Suite	XXVI	1954	163
Homemaking Spaces for New School Buildings	XXVII	1955	279
Needed Facilities for a Modern Homemaking Program	XXVII	1955	273
Planning the Homemaking Department: A Modern Concept	XXIII	1951	165

LIBRARIES

At Cornell University: Mann Library and Anabel Taylor Hall	XXVI	1954	323
Criteria for High School Library Spaces and Facilities	XXVII	1955	267
Designing School Libraries	XXIV	1952	275
Edsel Ford Memorial Library at Hotchkiss School in Connecticut	XXVI	1954	263
Julia Rogers Library of Goucher College	XXVI	1954	329
Library Building—Northeastern University	XXVI	1954	333
Library for Tomorrow's Secondary School	XXV	1953	329
New Library of the State University of Iowa	XXIII	1951	339
School Library for Books . . . And Children Too!	XXVII	1955	261
University of Detroit Library Building	XXIV	1952	271
Wayne University's New Library Buildings	XXVII	1955	331

LIGHTING

Classrooms that Perform	XXIV	1952	327
Daylighting Classrooms by Clerestory	XXIII	1951	225
Developments in Daylighting Schools Since World War II	XXVII	1955	397
From Daylight to Darkness: Current Claims About School Lighting	XXIII	1951	185
Plastic Skydomes Pay Daylighting Dividends	XXVII	1955	405
School Lighting Progress to Date and Some Suggested Next Steps	XXIII	1951	173
Top Lighting vs. Side Lighting for School Interiors	XXVI	1954	397

LUNCHROOMS—ELEMENTARY AND SECONDARY SCHOOLS

Centralized Kitchen for School Lunch Programs	XXVI	1954	169
Planning the School Lunchroom	XXIV	1952	285

MAINTENANCE AND OPERATION OF THE SCHOOL PLANT

Cumulative Record for School Plants	XXVI	1954	449
Economy Through Insulation	XXIV	1952	325
Good Maintenance Practice—A Symposium	XXV	1953	377
Good Maintenance Practices: A Symposium	XXVI	1954	453
Symposium: Good Maintenance Practices	XXIV	1952	406
Symposium: Good Operation and Maintenance Practices	XXIII	1951	350
Symposium of Good Maintenance Practices	XXVII	1955	437

MODERNIZING OLD BUILDINGS

Modernizing School Buildings	XXIV	1952	401
Modernizing That Old Elementary School Building	XXVI	1954	175
Renovation in Fond Du Lac, Wisconsin	XXV	1953	359
School Building Modernization Programs	XXVII	1955	365

PHYSICAL EDUCATION

Arrangement of Courts on Gymnasium Floors	XXIII	1951	157
Phillips Academy's War Memorial			

	Volume	Year	Page
Gymnasium	XXVI	1954	267
Physical Education Equipment for the Modern School Plant	XXIII	1951	241
Surfacing the Open-Air Gymnasium	XXIII	1951	355

PLANNING AIDS

Budgets for School Building Programs	XXVII	1955	127
Comprehensive Guide to Use of THE AMERICAN SCHOOL AND UNIVERSITY	XXV	1953	407
Consultative Services Required in Planning School Buildings	XXVII	1955	149
Educational Consultants — Their Functions and Work	XXVI	1954	113
Flow Charts of School Building Planning	XXVI	1954	117
National Council on Schoolhouse Construction: Its Origin and Work	XXIV	1952	115
School Plant Consultative Services for the Local School District	XXVII	1955	153

PLANNING COLLEGE BUILDINGS

Centralia Junior College Administration Building	XXIV	1952	267
College and University Space Requirements	XXVI	1954	287
College Design, 1952	XXV	1953	207
New Classroom Building for Indiana State Teachers College	XXVII	1955	337
New Jersey Prepares to Meet the Demand for More Teachers	XXVI	1954	297
Planning Contra Costa Junior College	XXIV	1952	241
Planning the Campus of Brandeis University	XXIII	1951	313
Planning a Modern University	XXIII	1951	307
Promising Practices in the Educational Planning of New College Buildings	XXVII	1955	319

PLANNING ELEMENTARY AND SECONDARY SCHOOLS

Adolescents and Their Schools	XXVII	1955	193
Advantages of the Unit Plan for Secondary Schools	XXVII	1955	219
Capacity Formula for Secondary Schools	XXV	1953	141
Changing Secondary School Programs and Their Implications for Design	XXVII	1955	199
Charleston Looks Ahead	XXV	1953	255
Community Studies Its School Plant Problems	XXIII	1951	93
Cooperative Planning of School Plants	XXIV	1952	161
Do's and Dont's for Planning the School Plant	XXIV	1952	143
Educational Use of Corridor Space	XXV	1953	291
Engineering Solutions to Structural Design	XXV	1953	145
Facilities for School Camping	XXIV	1952	417
From Excavation to Dedication	XXIV	1952	185
How to Build a Low Cost School	XXIII	1951	221
How to Design Livable Schools	XXIV	1952	147
Human Values in School Architecture	XXVII	1955	113
Impact of Population Trends on Long-Range Planning	XXV	1953	149
Laboratories for Learning	XXVI	1954	135
Multiple-Use Corridors	XXV	1953	303
New Jersey Township Banks on Low-Cost Construction	XXIII	1951	257
Planning Adequate Space for the Custodian	XXIV	1952	293
Planning and Presenting New Schools with Scale Models	XXV	1953	139
Planning New High Schools	XXIV	1952	219
Relation of School Plant Planning to Total Community Planning	XXV	1953	109
Revelations in Planning School Building Programs	XXIII	1951	117
Riverside, California, Plans a New High School	XXVII	1955	241
Schenectady, New York, Plans a New High School	XXVII	1955	215
School Building Problems of Large City School Districts	XXIII	1951	125
School Building Problems of Suburban Communities	XXV	1953	129
School Buildings Can Be Waterproof	XXIII	1951	349
School System Plans for Two New Schools	XXIV	1952	213
Secondary School Design Since World War II	XXVII	1955	185
Self-Contained Classrooms Make the Grade	XXVII	1955	177
Social Living Facilities in High Schools and Colleges	XXVII	1955	257
Solution for New Secondary Schools —The Campus Plan	XXVII	1955	209
South Carolina's School Building Program	XXV	1953	161
Staff Planning for Scarsdale's Junior High School	XXVI	1954	121
Symposium: The Secondary School Plant of the Future	XXIV	1952	127
Trends in Educational Spaces in Junior High Schools	XXVI	1954	219
Trends in Multi-Purpose Rooms	XXIV	1952	279
Where Does the Corridor Go from Here?	XXV	1953	297

PLANT RESEARCH

Educational Building in 1950	XXIII	1951	53
Educational Building in 1951	XXIV	1952	65
Educational Building in 1952	XXV	1953	69
Educational Building in 1953	XXVI	1954	65
Educational Building in 1954	XXVII	1955	65
Needed Research in College and University Plant Use and Plant Planning	XXIII	1951	121
Proposed Research Institutes in School Plant Planning	XXVI	1954	425
Research Report No. 1, The Development of the Teaching Space Divider	XXVI	1954	433
Research Report No. 2, Spatial Approach to Planning the Physical Environment	XXVI	1954	437
Research Report No. 3, Towards an Economical Flexibility	XXVI	1954	441
Research Report No. 4, An Analysis of Two Multi-Purpose Corridor Types	XXVII	1955	415
Research Report No. 5, Relationship of Cost to the Geometry of a Building	XXVII	1955	419
Research Report No. 6, Implications of Child Growth and Development for School Plant Design	XXVII	1955	423
Research Report No. 7, "Glass Walls" and the Instructional Program	XXVII	1955	429

	Volume	Year	Page
Research Reports	XXV	1953	391
Whither College Enrollments?	XXIII	1951	131
SCHOOL PLUMBING			
Suggestions for Plumbing and Sanitation in School Buildings	XXVI	1954	415
Toilet Provisions in Elementary Schools	XXVI	1954	409
SCIENCE FACILITIES			
Are High School Science Facilities Adequate?	XXVII	1955	285
Cornell's New Engineering Materials Laboratories	XXIV	1952	321
Engineering-Technology Building to Aid University's Community Program	XXIII	1951	343
Facilities for Science Teacher Education	XXIV	1952	299
Fitch Hall of Pharmacy, Drake University	XXIII	1951	335
Medical Research Building, Emory University	XXVI	1954	367
Science Building at the University of Kansas	XXVI	1954	373
SWIMMING POOLS			
California All-Weather Pool	XXV	1953	277
School and College Swimming Pools	XXIV	1952	309
TRANSPORTATION			
Defining Limits for Free School Transportation Service	XXV	1953	383
Developments in School Transportation	XXVI	1954	461
Recent Developments in Pupil Transportation	XXIII	1951	368
School Transportation—A Look Ahead	XXV	1953	387
Selecting the Supervisor of Transportation	XXIV	1952	413
Ten Years of School Bus Transportation	XXVII	1955	447
VOCATIONAL EDUCATION			
Applied Arts Building, Fort Hays Kansas State College	XXVI	1954	379
Flexible Interiors for an Applied Arts Building	XXV	1953	287
Planning School Shop Facilities	XXVI	1954	145
Recommended Equipment for an Industrial Arts Shop	XXIII	1951	239
Spaces and Equipment for Graphic Arts Instruction	XXVII	1955	307
Unified Arts Program for Junior High Schools	XXVI	1954	153
Why Not Start a Merchandizing Laboratory?	XXIV	1952	289
Why the Flexible Shop?	XXIII	1951	235

INDEX TO COMPANIES

A

Accurate Metal Weather Strip Co., Inc. .....A 33
Adam Electric Co., Frank .....D 16,17
Adams & Westlake Company, The A–4/Ad
Advance Floor Machine Co. .....H 5
Alberene Stone Corporation of Virginia ....A 11, F 21
All-American Scoreboard Corporation .....G 20
Allied Chemical & Dye Corporation,
Barrett Division .....A 14
All-Steel Equipment Inc. .....D 51
Aluminum Cooking Utensil Company, The ...E 14,15
Aluminum Greenhouses, Inc. .....F 26
Aluminum Window Manufacturers
Association A–4/A1
American Abrasive Metals Co. .....B 12,13
American Air Filter Company, Inc.,
Herman Nelson Unit Ventilator Products .C–1/Nel
American Bitumuls & Asphalt Company ..H–3/AmB
American Bridge, American Bridge Division,
United States Steel Corporation .....G 7
American City Bureau .....B 11
American Floor Surfacing Machine Co., The .....H 6
American Mason Safety Tread Co. .....B 16
American Optical Company
Projectors D–1/AO
Scientific Instruments .....F 12,13
American Playground Device Company .....G 28,29
American School Publishing Corp. .....F 60
American Seating Company D–3/AmS
American Steel & Wire Division, Cyclone Fence
Department, United States Steel Corporation H 28
American 3 Way-Luxfer Prism Co. A–3/AmT
American Welding and Manufacturing
Company, The G–1/AmW
Anchor Post Fence Division,
Anchor Post Products, Inc. .....H 25
Anderson-Hickey Company .....D 31
Anetsberger Brothers, Inc. E–2/An
Arlington Seating Company .....D 32,33
Armstrong Machine Works .....C 9
Art Craft Theatre Equipment Co. .....D 18
Art Metal Construction Co. D–5/Ar
Atlas Press Company .....F 34,35
Automatic Devices Company .....D 19
Axelson Manufacturing Co.,
Division of U. S. Industries, Inc. 1212

B

Babcock & Wilcox Company, The, Boiler Division C 10
Baldwin Piano Company, The .....D 14,15
Bangor Cork Co. B–6/Ba
Barrett Division, Allied Chemical & Dye
Corporation .....A 14
Bassick Company, The D–3/Ba
Bayley Company, The William .....A 24,25
Behr Co., Herman G. 1210
Benjamin Electric Mfg. Co.
Lighting .....C 41,42,43
Chalkboards .....B 36
Bennett Manufacturing Company, The G–5/Be
Berlin Chapman Company G–1/Be
Blickman, Inc., S. .....E 13
Bogen Company, Inc., David .....D 8,9
Boice-Crane Company .....F 36
Boonton Molding Company .....E 5
Brewer-Titchener Corporation, The .....D 34
Brown & Sharpe Mfg. Co. .....F 37–40
Brown Company, M. D. .....G 21
Brunswick-Balke-Collender Co., The D–3/Br
Brunswick-Balke-Collender Company, The,
Horn Division B–5/Ho
Buckeye Glide Co., Inc. .....D 35
Buffalo-Eclipse Corporation, The Eclipse
Lawn Mower Co. Division .....H 32

C

Califone Corporation .....D 7
Capitol Stage Lighting Co., Inc. .....D 20
Carolina Metal Products .....H 35
Carpenter & Company Inc., L. E. B–3/Ca
Carrom Industries, Inc. .....E 27
Castadia Inc. .....G 8
Celotex Corporation, The .....B 24
Century Brass Works, Inc. .....C 32
Century Lighting, Inc. D–2/Ce
Cincinnati Lathe & Tool Co. .....F 42,43
Cincinnati Milling Machine Co., The,
Cincinnati Grinders Incorporated F–3/Ci
Claridge Products and Equipment, Inc. .....B 37
Clarke Sanding Machine Company .....H 7
Cleveland Range Co., The .....E 16
Clow & Sons, James B. C–1/Cl
Colorado Fuel and Iron Corp., The .....H 26
Columbus Coated Fabrics Corporation .....A 31
Combustioneer Division, The Steel Products
Engineering Company .....C 11
Congoleum Nairn Inc., Gold Seal Division .....B 14
Continental Car-Na-Var Corporation .....H 8
Continental Steel Corporation .....H 27
Coppes, Incorporated .....E 25
Cordley and Hayes .....C 33
Cornell Iron Works, Inc. .....B 44
Corning Glass Works, Consumer Products
Division .....E 6,7
Crane Co. .....C 34,35
Cretors G–1/Cr
Crouse-Hinds Company .....G 24
Cupples Products Corporation A–4/Cu
Curtis Lighting, Inc. .....C 44,45

Cyclone Fence Department, American Steel & Wire Division, United States Steel Corporation ..... H 28
Cyclotherm, Division United States Radiator Corp. ..... C 12

D

Dant and Russell Sales Co. B–4/Da
Desco Corporation G–3/De
Devere Company ..... H 31
Diebold, Inc. ..... D 52,53
Dudley Lock Corporation ..... F 62
DuKane Corporation ..... D 10,11
Duralab Equipment Corp. ..... F 24
Duro Metal Products Company ..... F 41

E

Eclipse Lawn Mower Co., The, Division of Buffalo-Eclipse Corporation ..... H 32
Educational Devices, Inc. G–3/De
Educators Manufacturing Co. D–3/Ed
Electric-Aire Engineering Corp. ..... C 39
Electrikiln Division, The Harrop Ceramic Service Co. ..... F 53
Electric Storage Battery Company, The, Exide Industrial Division ..... C 50
Empire Varnish Company, The, Waterlox Division . H 9
Everett Piano Company, Division of Meridan Corp. ..... D 13
Exide Industrial Division, The Electric Storage Battery Company ..... C 50

F

Fairhurst Co., Inc., John T. ..... B 30,31
Fair Play Mfg. Co. ..... G 22
Farrar & Trefts, Inc. ..... C 13
Faultless Caster Corporation ..... D 36
Fedders-Quigan Corporation, Heating Division .. C 14
Federal Equipment Co., The D–5/Fe
Federal Pacific Electric Co. ..... F 16
Fiberesin Plastics Company D–3/Fi
Flintkote Company, The, The Tile-Tex Division .. B 17
Flynn Manufacturing Co., Michael ..... A 26,27
Formica Company, The ..... D 39
Forse Manufacturing Company ..... A 32
Fuller Brush Company, The ..... H 10

G

Gannon Co., Inc., The Russell R. ..... C 15
General Bronze Corporation A–4/Ge
General Electric Company
Apparatus Sales Division ..... F 5–11
Ballasts ..... C 40
Floodlighting ..... G 25
Homemaking E–3/GE
Textolite D–3/GE
General Fireproofing Company D–5/Ge
General Floorcraft, Inc. ..... H 11
General Lighting Company ..... D 22,23
General Playground Equipment Inc. ..... G 30
General School Equipment Company ..... D 42
Globe-Wernicke Co., The ..... D 54,55
Glynn-Johnson Corporation B–9/Gl
Gold Seal Division, Congoleum Nairn Inc. ..... B 14
Gravely Tractors, Incorporated ..... H 33
Graybar Electric Company, Inc. ..... C 51
Greenlee Tool Co., Division of Greenlee Bros. & Co. ..... F 29
Griggs Equipment Company D–3/Gr
Grinnell Company ..... C 8
Grogg Bros. Mfg. Co. ..... D 30
Guth Company, The Edwin F. ..... C 48

H

Haldeman-Homme Mfg. Co. E–1/Ha
Harrop Ceramic Service Co., The, Electrikiln Division ..... F 53
Heywood-Wakefield Company, School Furniture Division ..... D 37
Hild Floor Machine Company ..... H 12,13
Hillyard Chemical Company ..... H 14,15
Holliston Mills, Inc., The ..... D 61
Holophane Company, Inc. ..... C 46,47
Holt Manufacturing Company ..... H 16
Horn Corporation, A. C. A–8/Ho
Horn Division, The Brunswick-Balke-Collender Company B–5/Ho
Howe Folding Furniture, Inc. ..... D 38
Huntington Laboratories, Inc. H–1/Hu
Huntington Laboratories ..... H 21
Hussey Mfg. Co., Inc. ..... G 9

I

Ideal Seating Company D–3/Id
Industrial Machine Tool Co. Inc., Tru-Seal Window Division ..... A 23
Inland Steel Products Company ..... B 38
Insulrock Corporation, S. K. ..... A 15
Interior Steel Equipment Co., The
Lockers ..... F 55
Wardrobes ..... B 50
International Boiler Works Co., The ..... C 16
International Business Machines Corporation C–7/IBM
International Silver Company, The, Hotel Division E 8
Irwin Seating Company ..... D 40

J

Jackson & Church, Furnace Division ..... C 17
Jecmen Company, The ..... B 39
Jennison-Wright Corporation, The B–1/Je
Joanna Western Mills Company A–5/Jo
Johns-Manville ..... B 25–28
Johnson Service Company ..... C 18,19
Johnston Brothers, Inc. ..... C 20

K

Kearney & Trecker Corporation 1211
Kearney & Trecker Corporation, Walker-Turner Division ..... F 50,51

Kent Company, Inc., The ..... H 17
Kewaunee Manufacturing Company F–2/Ke
Keyes Fibre Sales Corporation ..... E 9
Kimble Glass Company Subsidiary of
Owens-Illinois ..... A 20,21
Kinnear Manufacturing Co., The ..... B 45
Kirsch Company A–6/Ki
Klett Manufacturing Co. ..... F 14,15
Kliegl Bros. ..... D 21
Knight, Maurice A. F–2/Kn
Knoxville Scenic Studios Incorporated ..... D 24
Kuehne Manufacturing Company, School
Furniture Division D–3/Ku
Kut-Kwick Corporation ..... H 34

L

Laboratory Furniture Co., Inc. ..... F 22,23
Laclede Steel Company ..... A 12
Lawler Automatic Controls, Inc. ..... C 36
LeBlond Machine Tool Co., The R. K. ..... F 44
Legge Company, Inc., Walter G. ..... H 18
Levolor Lorentzen, Inc. A–6/Le
Libbey-Owens-Ford Glass Company A–4/LOF
Lincoln-Schlueter Floor Machinery Company ... H 19
Logan Engineering Company ..... F 45
Long Island Bleacher Co., Inc. ..... G 12
Lord and Burnham ..... F 27
Loxit Systems, Inc. ..... B 15
Lufkin Rule Co., The ..... F 30
Lyon Metal Products, Incorporated ..... F 56,57

M

Macomber Incorporated ..... A 13
Market Forge Company E–2/Ma
Marmet Corporation A–4/Ma
Martin-Parry Corporation ..... B 29
Master Lock Company ..... F 63
Medart Products, Inc., Fred
Gym Seats & Apparatus ..... G 10,11
Lockers ..... F 58,59
Melflex Products Company, Inc. ..... B 18
Meridan Corp., Everett Piano Company Division.. D 13
Metalab Equipment Corp. F–2/Me
Metropolitan Brick, Inc. B–3/Me
Metwood Manufacturing Co. D–3/Me
Michaels Art Bronze Co. Inc. ..... B 57
Midwest Folding Products ..... D 41
Millers Falls Company ..... F 31
Mills Metal Compartment Co.,
Division of The Mills Company B–5/Mi
Mitchell Manufacturing Co. ..... D 44,45,46
Montgomery Manufacturing Co. ..... C 52
Morse Boulger Destructor Co. ..... C 31
Mosaic Tile Company, The ..... B 22,23
Multi-Clean Products, Inc. ..... H 20
Mutschler Brothers Company E–3/Mu

N

Naden and Sons Electric Scoreboard Company .. G 23
Nash Engineering Company, The ..... C 21
Natco Corporation ..... B 20
National Cash Register Company, The ..... D 60
National Cornice Works E–2/Na
National Lock Company ..... F 64
National School Furniture Company D–3/NaS
National Terrazzo & Mosaic Association, Inc.,
The B–1/Na
National Vulcanized Fibre Co. ..... H 22
Natural Slate Blackboard Co. and
The Structural Slate Co. ..... B 40
Nelson Company, Inc., A. R. ..... B 51
Nelson Unit Ventilator Products, Herman,
American Air Filter Company, Inc. C–1/Nel
Nesbitt, Inc., John J. C–1/Nes
Niagara Machine & Tool Works ..... F 46
Norcor Manufacturing Company ..... D 43
North American Iron & Steel Co., Inc.
Flagpoles, Railing ..... H 29
Overhead Doors and Grilles ..... B 48
Norton Door Closers ..... B 54
Novelty Scenic Studios, Inc. D–2/No
Nutting Truck and Caster Company ..... E 17

O

Olin Mathieson Chemical Corporation,
Industrial Chemicals Division ..... G 26
Oliver Machinery Company ..... F 47
Oneida, Ltd. ..... E 18
Orr & Sembower, Inc. ..... C 24
Owens-Illinois, Kimble Glass Company
Subsidiary ..... A 20,21

P

Pacific Shaw Company G–4/Pa
Pennsylvania Slate Producers Guild, Inc. ..... B 41
Pereny Equipment Company ..... F 54
Petro ..... C 22,23
Pittsburgh Corning Corporation
PC Glass Blocks ..... A 19
Skytrol Glass Blocks ..... A 22
Pittsburgh-Des Moines Steel Company ..... G 13
Pittsburgh Stage, Inc. ..... D 25
Plastic Products, Incorporated D–1/Pl
Playtime Equipment Corp. ..... G 14
Porta-Play, Inc. G–3/De
Powermatic Machine Co. ..... F 48
Powers Regulator Co., The C–3/Po
Presto Recording Corporation ..... D 12
Puffer-Hubbard Refrigerator Company ..... E 19

R

Radio Corporation of America D–1/RCA
Recreation Equipment Corporation ..... G 31
Remington Rand, Division of Sperry-Rand
Corporation ..... D 56,57
Republic Steel, Truscon Steel Division ..... A 28,29
Richards-Wilcox Mfg. Co. ..... B 52,53
Rilco Laminated Products, Inc. ..... A 16,17
Rixson Co., The Oscar C. B–9/Ri
Robertson Company, H. H. A–2/Ro

Rol-fol Table, Inc. E–1/Ro
Rowles Co., E. W. A.
School Equipment ..... B 42
School Furniture ..... D 47

S

Safway Steel Products, Inc. ..... G 15
Sanymetal Products Company, Inc., The .... B 32,33
Schieber Sales Company E–1/Sc
School Executive, The ..... D 62
School Interiors, Inc. ..... D 48
Seat-Eat Incorporated ..... E 10,11
Seats and Desks, Inc. ..... D 49
Sedgwick Machine Works ..... E 32
Shwayder Bros., Inc. D–3/Sh
Sico Grandstands, Inc. ..... G 16
Sico Manufacturing Company, Inc. ..... E 12
Siems Bros., Inc., Trussbilt Division ..... B 46,47
Simmons Company ..... E 28,29
Simplex Time Recorder Co. C–7/Si
Singer Sewing Machine Co. ..... E 26
Smith Co., Inc., The H. B. C–1/Sm
South Bend Lathe Works ..... F 49
Spencer Industries, Inc. ..... B 58
Spencer Turbine Company, The ..... H 23
Sperry-Rand Corporation, Remington Rand
Division ..... D 56,57
Stacor Equipment Co. F–3/St
Standard Dry Wall Products, Inc. A–8/St
Standard Pressed Steel Co. ..... F 28
Stanley Tools, Educational Department ..... F 32
Stanley Works, The, Hardware Division ..... B 55
Starrett Company, The L. S. ..... F 33
Star Steel Equipment Co., Inc. ..... F 61
Steel Products Engineering Company, The,
Combustioneer Division ..... C 11
Stewart Iron Works Company, Incorporated, The . H 30
Strong Electric Corporation, The ..... D 26
Structural Slate Co., The, and
Natural Slate Blackboard Co. ..... B 40
Struthers Wells Corporation,
Titusville Iron Works Division ..... C 26,27
Sunbeam Lighting Company C–5/Su
Superior Sleeprite Corp., Contract Division .. E 30,31
Swartwout Company, The ..... C 25
Symmons Engineering Company ..... C 37

T

Taylor Co., The Halsey W. ..... C 38
Thompson Electric Company, The ..... C 49
Tile-Tex Division, The, The Flintkote Company .. B 17
Titusville Iron Works,
Division of Struthers Wells Corporation .. C 26,27
Toledo Metal Furniture Company, The D–3/To
Toledo Scale Company ..... E 20
Tolerton Company, The F–3/To
Trane Company, The ..... C 28,29
Triumph Mfg. Co., The ..... E 21
Truscon Steel Division, Republic Steel ..... A 28,29
Tru-Seal Window Division,
Industrial Machine Tool Co., Inc. ..... A 23
Trussbilt, Division of Siems Bros., Inc. ..... B 46,47

U

Underwood Corporation ..... D 58,59
United Floor Machine Company, Inc. ..... H 24
United Metal Cabinet Corporation ..... G 32
United States Bronze Sign Co., Inc. ..... B 59
U. S.-Burke Machine Tool Div. ..... F 52
United States Ceramic Tile Co. ..... B 21
U. S. Industries, Inc.,
Axelson Manufacturing Co. Division 1212
United States Plywood Corporation
Chalkboards ..... B 43
Hardwood Panels ..... B 49
United States Radiator Corp.,
Cyclotherm Division ..... C 12
United States Steel Corporation, American Bridge,
American Bridge Division ..... G 7
United States Steel Corporation, Cyclone Fence
Department, American Steel & Wire Division H 28
United States Stoneware Co., The ..... F 25
Universal Bleacher Company ..... G 17
Universal Dishwashing Machinery Co. ..... E 22
Universal Industries ..... E 23
University Loudspeakers, Inc. D–1/Un
Uvalde Rock Asphalt Company B–1/Uv

V

Van Range Co., The John ..... E 24
Virco Manufacturing Corporation D–3/Vi
Vogel-Peterson Co. D–3/Vo
Vonnegut Hardware Co., Von Duprin Division .. B 56

W

Walker-Turner Division, Kearney & Trecker
Corporation ..... F 50,51
Wallace & Tiernan ..... G 27
Ward Leonard Electric Company ..... D 27
Waterlox Division, The Empire Varnish Company . H 9
Wayne Iron Works
Folding Partitions ..... B 34,35
Gymstands ..... G 18,19
Weiss and Sons, I. ..... D 28,29
Western Waterproofing Company, Inc. ..... A 34
Westinghouse Electric Corporation F–1/We
Westmoreland Seating, Division of
Westmoreland Metal Mfg. Co. D–3/We
Weston Electrical Instrument Corporation .. F 17–20
White Sewing Machine Corporation E–3/Wh
Will-Burt Company, The ..... C 30
Williams and Brower, Inc. ..... D 50
Windalume Corporation ..... A 30
Wood Metal Industries, Inc. E–3/Wo
Wooster Products, Inc. ..... B 19

Y

Yale Lock & Hardware Division,
Yale & Towne Mfg. Co. B–9/Ya

Z

Zonolite Company ..... A 18

MANUFACTURERS' PRODUCT INDEX

Access Doors (see Doors—Access)

Accounting Machines
International Business Machines Corp. C7/IBM
National Cash Register Co. D60
Remington Rand D56, 57
Underwood Corporation D58, 59

Acid Storage Containers & Cabinets
Alberene Stone Corp. of Virginia F21
Duralab Equipment Corp. F24
Kewaunee Manufacturing Co. F2/Ke
Knight, Maurice A. F2/Kn
Laboratory Furniture Co. Inc. F22, 23
Metalab Equipment Corp. F2/Me

Acoustical Materials
Celotex Corporation B24
Dant & Russell Sales Co. B4/Da
Johns-Manville B25-28
Zonolite Company A18

Acoustical Tile Suspension System
Loxit Systems, Inc. B15

Adding Machines
National Cash Register Co. D60
Remington Rand D56, 57
Underwood Corporation D58

Air Conditioning
Radio Corp. of America D1/RCA
Trane Company C28, 29

Alarm Systems
Diebold, Inc. D52, 53
Graybar Electric Co., Inc. C51
International Business Machines Corp. C7/IBM
Simplex Time Recorder Co. C7/Si

Aluminum Windows
Adams & Westlake Company A4/Ad
Aluminum Window Manufacturers Association A4/Al
Bayley Co., William A24, 25
Cupples Products Corporation A4/Cu
Flynn Mfg. Co., Michael A26, 27
General Bronze Corporation A4/Ge
Marmet Corporation A4/Ma
Tru-Seal Window Division, Industrial Machine Tool Co., Inc. A23
Windalume Corporation A30

Ammeters & Voltmeters (see Meters)

Ammonia Control Apparatus
Wallace & Tiernan G27

Amplifiers
General Electric Company F5-11
Radio Corp. of America D1/RCA

Analyzers—Laboratory (see Meters—Research & Testing)

Arches—Roof
Rilco Laminated Products, Inc. ... A16, 17
Macomber Incorporated A13

Art & Drafting Tables (see Tables—Art & Drafting)

Asbestos Curtains
Art Craft Theatre Equipment Co. D18
Knoxville Scenic Studios Inc. D24
Novelty Scenic Studios, Inc. D2/No
Pittsburgh Stage, Inc. D25
Weiss & Sons, I. D28, 29

Asbestos Products
Johns-Manville B25-28

Asphalt Shingles
Johns-Manville B25-28

Asphalt Tile Flooring (see Flooring)

Athlete's Foot Preventive
Huntington Laboratories, Inc. H1/Hu; H21
Olin Mathieson Chemical Corporation G26

Athletic Timers (see Sports Timing Equipment)

Audio-Visual Light Control
Columbus Coated Fabrics Corp. A31
Forse Manufacturing Co. A32
Joanna Western Mills Co. A5/Jo
Kirsch Company A6/Ki
Levolor Lorentzen, Inc. A6/Le
Plastic Products, Inc. D1/Pl
Rowles Co. B42

Auditorium Seating (see Chairs—Auditorium & Classroom)

Automatic Fire Sprinkler Systems (see Sprinklers)

Automatic Stokers (see Stokers—Automatic)

Backstops—Tennis Court, Baseball and Basketball
American Playground Device Co. G28, 29
Anchor Post Products, Inc. H25
Cyclone Fence Dept., United States Steel Corporation H28
Desco Corp. G3/De
Medart Products, Inc. G10, 11
Recreation Equipment Corp. G31
Stewart Iron Works Co., Inc. H30

Baking Equipment—Cafeteria
Anetsberger Brothers, Inc. E2/An

Ballasts—Fluorescent
General Electric Company C40

Band Saws (see Saws—Band, Circular, Scroll, etc.)

Band Stands
Haldeman-Homme Mfg. Co. E1/Ha
Horn Div., Brunswick-Balke-Collender Co. B5/Ho
Metwood Mfg. Co. D3/Me
Mitchell Mfg. Co. D44, 45, 46
Playtime Equipment Corp. G14

Banquet Tables
American Seating Company D3/AmS
Brewer-Titchener Corporation D34
Brunswick-Balke-Collender Co. D3/Br
Griggs Equipment Co. D3/Gr
Gregg Bros. Mfg. Co. D30
Haldeman-Homme Mfg. Co. E1/Ha
Howe Folding Furniture, Inc. D38
Metwood Mfg. Co. D3/Me
Midwest Folding Products D41
Mitchell Mfg. Co. D44, 45, 46
National School Furniture Co. .. D3/NaS
Rol-Fol Table, Inc. E1/Ro
School Interiors Co. Inc. D48
Seat-Eat, Inc. E10, 11
Shwayder Bros., Inc. D3/Sh
Sico Manufacturing Co. Inc. E12
Toledo Metal Furniture Co. D3/To
Virco Mfg. Corporation D3/Vi

Barbed Wire (see Wire Barbed)

Baseboard
Gold Seal Div., Congoleum Nairn, Inc. B14
Inland Steel Products Company B38
Johns-Manville B25-28
Natural Slate Blackboard Co. B40
Pennsylvania Slate Producers Guild Inc. B41

Baskets—Steam Cooking
Market Forge Company E2/Ma

Baskets—Waste (see Receptacles—Waste)

Baskets—Wire
Interior Steel Equipment Co. F55
Pacific Shaw Company G4/Pa
Star Steel Equipment Co. Inc. F61

Batteries
Exide Industrial Div., Electric Storage Battery Co. C50
Graybar Electric Co., Inc. C51

Beach Equipment
American Playground Device Co. G28, 29
Desco Corp. G3/De
General Playground Equipment Inc. . G30
Hussey Mfg. Co., Inc. G9
Recreation Equipment Corp. G31

Beam Clamps
Thompson Electric Company C49

Beaters—Food
General Electric Company E3/Ge
Triumph Mfg. Co. E21
Universal Industries E23

Beds & Bedding
Carrom Industries, Inc. E27
Simmons Company E28, 29
Superior Sleeprite Corp. E30, 31

Bells—Electrical & Mechanical
Graybar Electric Co., Inc. C51
International Business Machines Corp. C7/IBM
Montgomery Mfg. Co. C52
Simplex Time Recorder Co. C7/Si

Bench Lathes (see Lathes)

Benches—Campus and Park (see Settees)

Benches—Seating
American Playground Device Co. G28, 29
Gregg Bros. Mfg. Co. D30
Haldeman-Homme Mfg. Co. E1/Ha
Howe Folding Furniture, Inc. D38
Metwood Mfg. Co. D3/Me
Midwest Folding Products D41
Mitchell Mfg. Co. D44, 45, 46
Rol-Fol Table, Inc. E1/Ro
Schieber Sales Company E1/Sc
Seat-Eat Inc. E10, 11
Sico Manufacturing Co. Inc. E12
Stewart Iron Works Co., Inc. H30

Benches—Work
Interior Steel Equipment Co. F55
Kewaunee Manufacturing Co. F2/Ke
Laboratory Furniture Co., Inc. ... F22, 23
Lyon Metal Products, Inc. F56, 57
Metalab Equipment Corp. F2/Me
Mutschler Brothers Co. E3/Mu
Stacor Equipment Co. F3/St
Standard Pressed Steel Co. F28
Tolerton Company F3/To

Bicycle Racks
American Playground Device Co. G28, 29
General Playground Equipment, Inc. . G30
Recreation Equipment Corp. G31

Binding Materials—Book
Holliston Mills, Inc. D61

Bins for Small Parts—Shop
Interior Steel Equipment Co. F55
Lyon Metal Products, Inc. F56, 57

Biology Cases
Duralab Equipment Corp. F24
Kewaunee Manufacturing Co. F2/Ke
Laboratory Furniture Co., Inc. ... F22, 23
Metalab Equipment Corp. F2/Me

Bits and Braces
Greenlee Tool Co. F29
Millers Falls Company F31
Stanley Tools F32

Blackboards (see Chalkboards)

Bleachers and Grandstands—Folding & Permanent
American Bridge (Div. United States Steel Corporation) G7
American Welding & Mfg. Co. . G1/AmW
Berlin Chapman Co. G1/Be
Castadia Inc. G8
Horn Div., Brunswick-Balke-Collender Co. B5/Ho
Hussey Mfg. Co., Inc. G9
Long Island Bleacher Co., Inc. G12
Medart Products, Inc. G10, 11
Pittsburgh-Des Moines Steel Co. G13
Playtime Equipment Corp. G14
Safway Steel Products, Inc. G15
Sico Grandstands, Inc. G16
Universal Bleacher Company G17
Wayne Iron Works G18

Bleaching & Sterilizing Solutions
Olin Mathieson Chemical Corporation G26

Blinds—Venetian
Kirsch Company A6/Ki
Levolor Lorentzen, Inc. A6/Le
Rowles Co. B42

Blocks—Glass (see Glass Block)

Boards—Bulletin & Directory (see Bulletin Boards)

Boiler Cleaners—Vacuum
Kent Company, Inc. H17
Multi-Clean Products, Inc. H20
Spencer Turbine Company H23
United Floor Machine Company, Inc. . H24

Boilers—Heating System
Babcock & Wilcox Company C10
Cyclotherm Div., United States Radiator Corp. C12
Farrar & Trefts, Inc. C13
International Boiler Works Co. C16
Johnston Brothers, Inc. C20
Orr & Sembower, Inc. C24
Petro C22, 23
Smith Co., Inc., H. B. C1/Sm
Titusville Iron Works, Div. Struthers Wells Corp. C26, 27

Bolts—Fire & Panic
Vonnegut Hardware Co., Von Duprin Div. B56

Book Binding Materials
Holliston Mills, Inc. D61

Book Cases, Cabinets & Racks
All-Steel Equipment Inc. D51
Art Metal Construction Co. D5/Ar
Educators Manufacturing Co. D3/Ed
General Fireproofing Company ... D5/Ge
Globe-Wernicke Co. D54, 55
Interior Steel Equipment Co. F55
Kewaunee Manufacturing Co. F2/Ke
Mutschler Brothers Co. E3/Mu
Remington Rand D56, 57
Simmons Company E28, 29
Star Steel Equipment Co., Inc. F61
Wood-Metal Industries, Inc. E3/Wo

Bookkeeping Machines
National Cash Register Co. D60
Remington Rand D56, 57
Underwood Corporation D58, 59

Book Shelving & Stacks
Art Metal Construction Co. D5/Ar
Educators Manufacturing Co. D3/Ed
General Fireproofing Company ... D5/Ge
Globe-Wernicke Co. D54, 55
Interior Steel Equipment Co. F55
Kewaunee Manufacturing Co. F2/Ke
Remington Rand D56, 57
Star Steel Equipment Co., Inc. F61

Book Trucks (see Carts)

Bowls—Kitchen
Boonton Molding Company E5
Corning Glass Works E6, 7
Keyes Fibre Sales Corporation E9

Box Lockers (see Lockers)

Boxes—Metal, Shop (see Bins)

Bridges, D.C.-A.C.
General Electric Company F5-11
Weston Electrical Instrument Corp. F17-20

Broadcasting Equipment
Radio Corp. of America D1/RCA

Broilers—Electric
General Electric Company E3/GE

Bronze Tablets & Signs
Michaels Art Bronze Co., Inc. B57
Spencer Industries, Inc. B58
Stewart Iron Works Co., Inc. H30
United States Bronze Sign Co., Inc. .. B59

Brushes & Brooms
Fuller Brush Company H10

Builders' Hardware
Glynn-Johnson Corporation B9/Gl
Rixson Co., Oscar C. B9/Ri
Vonnegut Hardware Co., Von Duprin Div. B56
Yale & Towne Mfg. Company B9/Ya

Building Fund Campaigns
American City Bureau B11

Building Restoration
Horn Corporation, A. C. A8/Ho
Western Waterproofing Co., Inc. A34

Built-Up Roofing
Barrett Div., Allied Chemical & Dye Corp. A14
Johns-Manville B25-28

Bulletin & Directory Boards
Bangor Cork Co. B6/Ba
Behr Co., Herman G. 1210
Claridge Products & Equipment, Inc. . B37
Desco Corp. G3/De
Jecmen Company B39
Michaels Art Bronze Co., Inc. B57
Rowles Co. B42
Spencer Industries, Inc. B58
United States Bronze Sign Co., Inc. .. B59
United States Plywood Corp. B43

Burners—Heating System

Babcock & Wilcox Company C10
Combustioneer Div., Steel Products Engineering Company C11
Cyclotherm Div., United States Radiator Corp. C12
Farrar & Trefts, Inc. C13
International Boiler Works Co. C16
Jackson & Church C17
Johnston Brothers, Inc. C20
Orr & Sembower, Inc. C24
Petro C22, 23
Smith Co., Inc., H. B. C1/Sm
Titusville Iron Works, Div. Struthers Wells Corp. C26, 27

Buzzers, Chimes & Horns

Graybar Electric Co., Inc. C51
International Business Machines Corp. C7/IBM
Montgomery Mfg. Co. C52
Simplex Time Recorder Co. C7/Si

Cabinet Hardware (see Wardrobe Hardware)

Cabinets—Filing

All-Steel Equipment Inc. D51
Anderson-Hickey Co. D31
Art Metal Construction Co. D5/Ar
Diebold, Inc. D52, 53
General Fireproofing Company ... D5/Ge
Globe-Wernicke Co. D54, 55
Interior Steel Equipment Co. F55
Lyon Metal Products, Inc. F56, 57
Mutschler Brothers Company E3/Mu
Remington Rand D56, 57
Rowles Co. D47
Wood-Metal Industries, Inc. E3/Wo

Cabinets—Kitchen

Coppes, Incorporated E25
General Electric Company E3/GE
Kewaunee Manufacturing Co. F2/Ke
Lyon Metal Products, Inc. F56, 57
Mutschler Brothers Company E3/Mu
Wood-Metal Industries, Inc. E3/Wo

Cabinets—Special (Specimen, Film, etc.)

All-Steel Equipment Inc. D51
Art Metal Construction Co. D5/Ar
Coppes, Incorporated E25
Duralab Equipment Corp. F24
Educators Manufacturing Co. D3/Ed
Interior Steel Equipment Co. F55
Kewaunee Manufacturing Co. F2/Ke
Laboratory Furniture Co., Inc. ... F22, 23
Lyon Metal Products, Inc. F56, 57
Market Forge Company E2/Ma
Medart Products, Inc. F58, 59
Metalab Equipment Corp. F2/Me
Mutschler Brothers Company E3/Mu
Stacor Equipment Co. F3/St
Star Steel Equipment Co., Inc. F61
Tolerton Company F3/To
Wood-Metal Industries, Inc. E3/Wo

Cabinets—Storage

All-Steel Equipment Inc. D51
Anderson-Hickey Co. D31
Art Metal Construction Co. D5/Ar
Coppes, Incorporated E25
Desco Corp. G3/De
Diebold, Inc. D52, 53
Duralab Equipment Corp. F24
Educators Manufacturing Co. D3/Ed
General Electric Company E3/GE
General Fireproofing Company ... D5/Ge
Globe-Wernicke Co. D54, 55
Interior Steel Equipment Co. F55
Kewaunee Manufacturing Co. F2/Ke
Laboratory Furniture Co., Inc. ... F22, 23
Lyon Metal Products, Inc. F56, 57
Market Forge Company E2/Ma
Medart Products, Inc. F58, 59
Metalab Equipment Corp. F2/Me
Mutschler Brothers Company E3/Mu
Remington Rand D56, 57
School Interiors Co. Inc. D48
Stacor Equipment Co. F3/St
Star Steel Equipment Co., Inc. F61
Tolerton Company F3/To
Wood-Metal Industries, Inc. E3/Wo

Cafeteria Equipment

Aluminum Cooking Utensil Company E14, 15
Anetsberger Brothers, Inc. E2/An
Blickman, Inc., S. E13
Boenton Molding Company E5
Cleveland Range Co. E16
Corning Glass Works E6, 7
Keyes Fibre Sales Corporation E9
Market Forge Company E2/Ma
National Cornice Works E2/Na
Puffer-Hubbard Refrigerator Co. E19
Van Range Co., John E24

Cafeteria Furniture (see Furniture—Multi-Purpose)

Camera—Remote Control

Radio Corp. of America D1/RCA

Cans—Step-on, for Waste

United Metal Cabinet Corp. G32

Card Files & Systems

Art Metal Construction Co. D5/Ar
Diebold, Inc. D52, 53
General Fireproofing Company ... D5/Ge
Globe-Wernicke Co. D54, 55
International Business Machines Corp. C7/IBM
Remington Rand D56, 57

Carts—Food Service

Blickman, Inc., S. E13
National Cornice Works E2/Na
Nutting Truck and Caster Co. E17

Carts—Chair, Table, Books, Tools, etc.

Brewer-Titchener Corporation D34
Educators Manufacturing Co. D3/Ed
Gregg Bros. Mfg. Co. D30
Lyon Metal Products, Inc. F56, 57
Metwood Mfg. Co. D3/Me
Midwest Folding Products D41
Mitchell Mfg. Co. D44, 45, 46
Nutting Truck and Caster Co. E17
Pacific Shaw Company G4/Pa
Standard Pressed Steel Co. F28
Toledo Metal Furniture Co. D3/To

Casements—Door & Window

Aluminum Window Manufacturers Association A4/Al
General Bronze Corporation A4/Ge
Marmet Corporation A4/Ma

Cases—Museum & Display

Duralab Equipment Corp. F24
General Fireproofing Company ... D5/Ge
Kewaunee Manufacturing Co. F2/Ke
Laboratory Furniture Co., Inc. ... F22, 23
Metalab Equipment Corp. F2/Me
Michaels Art Bronze Co., Inc. B57
Mutschler Brothers Co. E3/Mu
Remington Rand D56, 57
Star Steel Equipment Co. Inc. F61

Cash Registers

National Cash Register Co. D60

Casters

Bassick Company D3/Ba
Buckeye Glide Co., Inc. D35
Faultless Caster Corporation D36
Nutting Truck and Caster Co. E17

Caulking Compounds & Cement Seals

Empire Varnish Company H9
Hillyard Chemical Company H14, 15
Horn Corporation, A. C. A8/Ho
Legge Company, Inc. H18
Multi-Clean Products, Inc. H20

Ceiling Slabs

Insulrock Corporation A15
Robertson Company, H. H. A2/Ro

Ceiling Tile (see Tile—Acoustical)

Ceiling & Floor Structure

Laclede Steel Company A12
Loxit Systems, Inc. B15
Natco Corporation B20
Robertson Company, H. H. A2/Ro

Ceilings—Acoustical (see Acoustical Materials)

Ceramic Furnaces (see Furnaces for Ceramics & Metals)

Chair-Desk Combination

American Seating Company D3/AmS
Arlington Seating Company D32, 33
Brunswick-Balke-Collender Co. D3/Br
General Fireproofing Company ... D5/Ge
General School Equipment Co. G42
Griggs Equipment Co. D3/Gr
Ideal Seating Co. D3/Id
Irwin Seating Company D40
Kuehne Mfg. Co. D3/Ku
Norcor Manufacturing Company D43
Rowles Co. D47
Virco Mfg. Corporation D3/Vi
Westmoreland Metal Mfg. Corp. . D3/We
Williams & Brower, Inc. D50

Chair Glides & Casters

Bassick Company D3/Ba
Buckeye Glide Co., Inc. D35
Faultless Caster Corporation D36

Chair Rail

Inland Steel Products Co. B38

Chair Trucks (see Trucks—Table, Chair, Book, Tool, etc.)

Chairs—Auditorium, Classroom, etc.

American Seating Company D3/AmS
Arlington Seating Company D32, 33

Brunswick-Balke-Collender Co. D3/Br
General Fireproofing Company ... D5/Ge
General School Equipment Co. D42
Griggs Equipment Co. D3/Gr
Heywood-Wakefield Company D37
Ideal Seating Co. D3/Id
Irwin Seating Company D40
Kuehne Mfg. Co. D3/Ku
National School Furniture Co. ... D3/NaS
Norcor Manufacturing Company D43
Rowles Co. D47
School Interiors Co. Inc. D48
Seats & Desks, Inc. D49
Toledo Metal Furniture Co. D3/To
Virco Mfg. Corporation D3/Vi
Westmoreland Metal Mfg. Corp. . D3/We
Williams & Brower, Inc. D50

Chairs—Dormitory

Carrom Industries, Inc. E27
General Fireproofing Company ... D5/Ge
Kuehne Mfg. Co. D3/Ku
Simmons Company E28, 29
Superior Sleeprite Corp. E30, 31

Chairs—Folding

American Seating Company D3/AmS
Brewer-Titchener Corp. D34
Brunswick-Balke-Collender Co. D3/Br
Griggs Equipment Co. D3/Gr
Ideal Seating Co. D3/Id
Irwin Seating Company D40
Lyon Metal Products, Inc. F56, 57
Mutschler Brothers Company E3/Mu
Norcor Manufacturing Company D43
Rowles Co. D47
Shwayder Bros., Inc. D3/Sh
Virco Mfg. Corporation D3/Vi
Westmoreland Metal Mfg. Corp. . D3/We

Chairs—Life Guard

American Playground Device Co. G28, 29
General Playground Equipment Inc. . G30

Chairs—Office & Library

All-Steel Equipment Inc. D51
American Seating Company D3/AmS
Arlington Seating Company D32, 33
Art Metal Construction Co. D5/Ar
Brunswick-Balke-Collender Co. D3/Br
General Fireproofing Company ... D5/Ge
General School Equipment Co. D42
Griggs Equipment Co. D3/Gr
Heywood-Wakefield Company D37
Ideal Seating Co. D3/Id
Irwin Seating Company D40
Kuehne Mfg. Co. D3/Ku
National School Furniture Co. ... D3/NaS
Norcor Manufacturing Company D43
Seats & Desks, Inc. D49
Standard Pressed Steel Co. F28
Toledo Metal Furniture Co. D3/To
Virco Mfg. Corporation D3/Vi
Westmoreland Metal Mfg. Corp. . D3/We
Williams & Brower, Inc. D50

Chairs—Stack

Brunswick-Balke-Collender Co. D3/Br
Kuehne Mfg. Co. D3/Ku
Rowles Co. D47
School Interiors Co., Inc. D48

Chairs—Tablet Arm

American Seating Company D3/AmS
Arlington Seating Company D32, 33
Brunswick-Balke-Collender Co. D3/Br
General Fireproofing Company ... D5/Ge
General School Equipment Co. D42
Griggs Equipment Co. D3/Gr
Heywood-Wakefield Company D37
Ideal Seating Co. D3/Id
Irwin Seating Company D40
Kuehne Mfg. Co. D3/Ku
Norcor Manufacturing Company D43
Rowles Co. D47
Toledo Metal Furniture Co. D3/To
Virco Mfg. Corporation D3/Vi
Westmoreland Metal Mfg. Corp. . D3/We
Williams & Brower, Inc. D50

Chalkboard Eraser Cleaners—Vacuum

Spencer Turbine Company H23

Chalkboard Troughs & Trim

Claridge Products & Equipment, Inc. . B37
Inland Steel Products Company B38
Loxit Systems, Inc. B15
Rowles Co. B42
United States Plywood Corp. B43

Chalkboards

Bangor Cork Co. B6/Ba
Behr Co., Herman G. 1210
Benjamin Electric Mfg. Co. B36
Claridge Products & Equipment, Inc. . B37
Desco Corp. G3/De
Jecmen Company B39
Loxit Systems, Inc. B15
Natural Slate Blackboard Co. B40
Pennsylvania Slate Producers Guild Inc. B41
Rowles Co. B42
United States Plywood Corp. B43
Vogel-Peterson Co. D3/Vo

Chandeliers

General Lighting Company, Inc. . D22, 23

Changeable Letter Signs

Behr Co., Herman G. 1210

Check Room Equipment

Desco Corp. G3/De
Nelson Co., Inc., A. R. B51
Spencer Industries, Inc. B58
Vogel-Peterson Company D3/Vo

Chemical Stoneware—Acid-Proof (see Stoneware—Acid-Proof)

Child Accounting Records

Art Metal Construction Co. D5/Ar
Diebold, Inc. D52, 53
Globe-Wernicke Co. D54, 55
Remington Rand D56, 57

Chisels (see Tools—Hand)

Chlorine Control Apparatus and Chlorine

Olin Mathieson Chemical Corporation G26
Wallace & Tiernan G27

Choral Stands

Haldeman-Homme Mfg. Co. E1/Ha
Horn Div., Brunswick-Balke-Collender Co. B5/Ho
Metwood Mfg. Co. D3/Me
Mitchell Mfg. Co. D44, 45, 46
Playtime Equipment Corp. G14
Sico Grandstands, Inc. G16

Circular Saws—Tilting Arbor (see Saws—Band, Circular, Scroll, etc.)

Classroom Seating (see Chairs)

Clay Tile—Structural (see Structural Tile)

Cleaners—Vacuum (see Vacuum Cleaners)

Cleaning Compounds

Continental Car-Na-Var Corp. H8
Fuller Brush Company H10
Hillyard Chemical Co. H14, 15
Huntington Laboratories, Inc. H1/Hu; H21
Legge Company, Inc. E18
Multi-Clean Products, Inc. H20
Olin Mathieson Chemical Corporation G26

Cleaning Contractors

Western Waterproofing Co., Inc. ... A34

Climbing Apparatus

American Playground Device Co. G28, 29
Desco Corp. G3/De
General Playground Equipment Inc. . G30
Recreation Equipment Corp. G31

Clocks

General Electric Company E3/GE
Graybar Electric Company, Inc. C51
International Business Machines Corp. C7/IBM
Montgomery Mfg. Co. C52
Simplex Time Recorder Co. C7/Si

Clothes Dryers (see Dryers—Clothes)

Coal Tar Products

Jennison-Wright Corporation B1/Je

Coat & Hat Racks

Desco Corp. G3/De
General Fireproofing Company ... D5/Ge
Lyon Metal Products, Inc. F56, 57
Nelson Co., Inc., A. R. B51
Vogel-Peterson Company D3/Vo

Coffee Urns

Blickman, Inc., S. E13
Van Range Co., John E24

Colorometers (see Photo-electric Units)

Combination Locks (see Locks—Combination & Key)

Comparators—Electronics Laboratory

General Electric Company F5-11

Concrete Reinforcing Materials

Laclede Steel Company A12
Truscon Steel Div., Republic Steel A28, 29

Concrete Stadiums (see Grandstands)

Condensers
General Electric Company F5-11
Westinghouse Electric Corporation . F1/We

Conductive Products for Floors
Legge Company, Inc. H18

Conservatories & Greenhouses
Aluminum Greenhouses, Inc. F26
Lord and Burnham F27

Conveyors & Lifts
Sedgwick Machine Works E32

Cooking Equipment & Utensils
Aluminum Cooking Utensil Company E14, 15
Cleveland Range Co. E16
General Electric Company E3/GE
Market Forge Company E2/Ma
Van Range Co., John E24

Cork Bulletin Boards
Bangor Cork Co. B6/Ba
Behr Co., Herman G. 1210
Claridge Products & Equipment, Inc. . B37
Jacmen Company B39
Loxit Systems, Inc. B15
Rowles Co. B42
Vogel-Peterson Company D3/Vo

Corrosion-Proof Paints (see Paints—Cement, Rust-Proof & Wall)

Cots—Nursery School
Pacific Shaw Company G4/Pa

Counter Tops (see Tops—Counter, Table & Desk)

Cove Base
Congoleum Nairn, Inc. Gold Seal Div. B14
Inland Steel Products Company B38
Johns-Manville B25-28

Creosote Oil
Jennison-Wright Corporation B1/Je

Cross Ties
Jennison-Wright Corporation B1/Je

Curb Bars
Alberene Stone Corp. of Virginia ... A11
American Abrasive Metals Co. .. B12, 13
American Mason Safety Tread Co. .. B16
Wooster Products, Inc. B19

Curtain Hoists, Tracks & Controls
Art Craft Theatre Equipment Co. ... D18
Automatic Devices Company D19
Knoxville Scenic Studios, Inc. D24
Novelty Scenic Studios, Inc. D2/No
Pittsburgh Stage, Inc. D25
Weiss & Sons, I. D28, 29

Curtains—Asbestos (see Asbestos Curtains)

Curtains & Draperies—Stage & Window
Art Craft Theatre Equipment Co. ... D18
Knoxville Scenic Studios, Inc. D24
Novelty Scenic Studios, Inc. D2/No
Pittsburgh Stage, Inc. D25
Plastic Products, Inc. D1/Pl
Weiss & Sons, I. D28, 29

Custodial Supplies (see Janitors' Supplies)

Cutlery
Aluminum Cooking Utensil Company E14, 15

Cutters—Food
Toledo Scale Company E20
Universal Industries E23

Cutters—Gear & Milling
Axelson Manufacturing Co. 1212
Brown & Sharpe Mfg. Co. F37-40
Cincinnati Milling Machine Co. F3/Ci
Kearney & Trecker Corp. 1211
LeBlond Machine Tool Co. F44
Niagara Machine & Tool Works F46
U. S. Burke Machine Tool Div. F52

Cycloramas
Art Craft Theatre Equipment Co. ... D18
Automatic Devices Company D19
Knoxville Scenic Studios, Inc. D24
Novelty Scenic Studios, Inc. D2/No
Pittsburgh Stage, Inc. D25
Weiss & Sons, I. D28, 29

Deodorants
Hillyard Chemical Company H14, 15
Huntington Laboratories, Inc. H1/Hu; H21
Olin Mathieson Chemical Corporation G26

Desk-Chair Combination
American Seating Company D3/AmS
Arlington Seating Company D32, 33
Brunswick-Balke-Collender Co. ... D3/Br
General Fireproofing Company ... D5/Ge
General School Equipment Co. D42
Griggs Equipment Co. D3/Gr
Ideal Seating Company D3/Id
Irwin Seating Company D40
Kuehne Mfg. Co. D3/Ku
Norcor Manufacturing Company D43
Rowles Co. D47
Virco Mfg. Corporation D3/Vi
Westmoreland Metal Mfg. Corp. . D3/We
Williams & Brower, Inc. D50

Desk Tops
Fiberesin Plastics Company D3/Fi
Formica Company D39
General Electric Company D3/GE
National School Furniture Co. ... D3/NaS

Desks—Charging
Art Metal Construction Co. D5/Ar
General Fireproofing Company ... D5/Ge
General School Equipment Co. D42
Globe-Wernicke Co. D54, 55

Desks—Classroom
All-Steel Equipment Inc. D51
American Seating Company D3/AmS
Arlington Seating Company D32, 33
Brunswick-Balke-Collender Co. D3/Br
General Fireproofing Company ... D5/Ge
General School Equipment Co. D42
Griggs Equipment Co. D3/Gr
Heywood-Wakefield Company D37
Ideal Seating Company D3/Id
Irwin Seating Company D40
Kuehne Mfg. Co. D3/Ku
National School Furniture Co. ... D3/NaS
Norcor Manufacturing Company D43
Rowles Co. D47
School Interiors Co., Inc. D48
Seats & Desks, Inc. D49
Toledo Metal Furniture Co. D3/To
Virco Mfg. Corporation D3/Vi
Westmoreland Metal Mfg. Corp. . D3/We
Williams & Brower, Inc. D50

Desks—Dormitory
Carrom Industries, Inc. E27
General Fireproofing Company ... D5/Ge
Heywood-Wakefield Company D37
Kuehne Mfg. Co. D3/Ku
National School Furniture Co. ... D3/NaS
Simmons Company E28, 29
Superior Sleeprite Corp. E30, 31

Desks—Instructors'
Anderson-Hickey Company D31
Art Metal Construction Co. D5/Ar
General Fireproofing Company ... D5/Ge
General School Equipment Company . D42
Kewaunee Manufacturing Co. F2/Ke
Kuehne Mfg. Co. D3/Ku
Laboratory Furniture Co., Inc. ... F22, 23
Metalab Equipment Corp. F2/Me
Mutschler Brothers Company E3/Mu

Desks—Office
All-Steel Equipment Inc. D51
Anderson-Hickey Company D31
Art Metal Construction Co. D5/Ar
General Fireproofing Company ... D5/Ge
Globe-Wernicke Co. D54, 55
Kuehne Mfg. Co. D3/Ku
Remington Rand D56, 57
Rowles Co. D47

Desks—Stack
Brunswick-Balke-Collender Co. D3/Br
Kuehne Mfg. Co. D3/Ku
Rowles Co. D47
School Interiors Co., Inc. D48

Desks—Typewriter (see Typewriter Desks)

Destructors—Garbage & Waste
General Electric Company E3/GE
Morse Boulger Destructor Co. C31

Detergents
Hillyard Chemical Company H14, 15
Huntington Laboratories Inc. H1/Hu; H21
Legge Company, Inc. E18
Olin Mathieson Chemical Corporation G26

Dimmers—Auditorium & Stage
Adam Electric Co., Frank D16, 17
Art Craft Theatre Equipment Co. D18
Capitol Stage Lighting Co., Inc. D20
Century Lighting, Inc. D2/Ce
Federal Pacific Electric Co. F16
Kliegl Bros. D21
Novelty Scenic Studios, Inc. D2/No
Ward Leonard Electric Co. D27
Weiss & Sons, I. D28, 29

Dining Hall Equipment
Boonton Molding Company E5
Corning Glass Works E6, 7
Keyes Fibre Sales Corporation E9
National School Furniture Co. .. D3/NaS
Schieber Sales Company E1/Sc

Directories (see Bulletin & Directory Boards)

Disconnecting & Lowering Hangers
Thompson Electric Company C49

Discs—Recording
Presto Recording Corporation D12

Dish Scrapper
Toledo Scale Company E20
Universal Dishwashing Machinery Co. E22

Dishes
Boonton Molding Company E5
Corning Glass Works E6, 7
Keyes Fibre Sales Corporation E9

Dishwashing Machines
General Electric Company E3/GE
Toledo Scale Company E20
Universal Dishwashing Machinery Co. E22

Disinfectants
Hillyard Chemical Company H14, 15
Huntington Laboratories Inc. H1/Hu; H21
Olin Mathieson Chemical Corporation G26

Dispensers—Soap (see Soap Dispensers)

Display Cases (see Cases—Museum & Display)

Diving Boards
American Playground Device Co. G28, 29
General Playground Equipment, Inc. . G30
Hussey Mfg. Co., Inc. G9
Recreation Equipment Corp. G31

Domestic Science Equipment (see Homemaking Furniture & Equipment)

Door Closers
Glynn-Johnson Corporation B9/Gl
Norton Door Closers B54
Rixson Co., Oscar C. B9/Ri
Yale & Towne Mfg. Company B9/Ya

Door Kicks & Push Plates
Michaels Art Bronze Co., Inc. B57

Door Locks
Dudley Lock Corporation F62
Master Lock Company F63
National Lock Company F64
Yale & Towne Mfg. Company B9/Ya

Door Pulls & Bars
Michaels Art Bronze Co., Inc. B57
Yale & Towne Mfg. Company B9/Ya

Door Saddles & Sills
Accurate Metal Weather Strip Co., Inc. A33
Alberene Stone Corp. of Virginia A11
American Abrasive Metals Co. .. B12, 13
American Mason Safety Tread Co. ... B16
Wooster Products Inc. B19

Door Sash (see Sash—Door & Window)

Door Stops & Holders
Glynn-Johnson Corporation B9/Gl
Yale & Towne Mfg. Company B9/Ya

Door Tracks
Richards-Wilcox Mfg. Co. B52, 53

Doors—Access
Inland Steel Products Company B38

Doors—Aluminum
Cupples Products Corporation A4/Cu
General Bronze Corporation A4/Ge
Marmet Corporation A4/Ma

Doors—Bronze
General Bronze Corporation A4/Ge
Michaels Art Bronze Co., Inc. B57

Doors—Casement (see Casements—Door & Window)

Doors—Entrance
General Bronze Corporation A4/Ge
Marmet Corporation A4/Ma
Michaels Art Bronze Co. Inc. B57
Trussbilt Div. of Siems Bros. Inc. B46, 47

Doors—Fire (see Fire Doors)

Doors—Steel
General Bronze Corporation A4/Ge
Truscon Steel Div., Republic Steel A28, 29
Trussbilt Div. of Siems Bros. Inc. B46, 47

Doors—Sliding & Upward Rolling
Cornell Iron Works, Inc. B44
Kinnear Manufacturing Co. B45
North American Iron & Steel Co., Inc. B48
Richards-Wilcox Mfg. Co. B52, 53

Doors—Vault
Diebold, Inc. D52, 53

Doors—Wood
United States Plywood Corp. B49

Dormitory Furniture
Carrom Industries, Inc. E27
General Fireproofing Company .. D5/Ge
Kuehne Mfg. Co. D3/Ku
Simmons Company E28, 29
Superior Sleeprite Corp. E30, 31

Dormitory Wall Covering
Carpenter & Co., Inc. B3/Ca

Dough Rolling Machine
Anetsberger Brothers, Inc. E2/An

Drafting Tables (see Tables—Art & Drafting)

Drainage Pipe & Fittings (see Pipe & Fittings)

Draperies & Curtains—Stage & Window
Art Craft Theatre Equipment Co. ... D18
Knoxville Scenic Studios D24
Novelty Scenic Studios, Inc. D2/No
Pittsburgh Stage, Inc. D25
Plastic Products, Inc. D1/Pl
Weiss & Sons, I. D28, 29

Dressers (see Dormitory Furniture)

Drill Stands & Presses
Atlas Press Company F34, 35
Boice-Crane Company F36
Cincinnati Lathe & Tool Co. F42, 43
Dure Metal Products Company F41
Millers Falls Company F31
South Bend Lathe Works F49
Walker-Turner Div., Kearney & Trecker Corp. F50, 51

Drills—Portable Electric
Millers Falls Company F31

Drills—Hand
Greenlee Tool Co. F29
Millers Falls Company F31
Stanley Tools F32

Drinking Fountains
Century Brass Works, Inc. C32
Cordley & Hayes C33
Crane Co. C34, 35
Taylor Co., Halsey W. C38

Dryers—Clothes
General Electric Company E3/GE

Dryers for Hands & Hair
Electric-Aire Engineering Corp. C39

Dumbwaiters
Sedgwick Machine Works E32

Duplicator Supplies
Remington Rand D56, 57
Underwood Corporation D58, 59

Dynamometers (see Galvanometers & Dynamometers)

Earthenware—Acid-Resisting (see Stoneware)

Electric Floor Sanders (see Sanders)

Electric Floor Scrubbing-Polishing Machines
Advance Floor Machine Company H5
American Floor Surfacing Machine Co. H6
Clarke Sanding Machine Company ... H7
Continental Car-Na-Var Corp. H8
General Floorcraft, Inc. H11
Hild Floor Machine Company .. H12, 13
Holt Manufacturing Company H16
Huntington Laboratories, Inc. H1/Hu; H21
Kent Company, Inc. H17
Lincoln-Schlueter Floor Machinery Co. H19
Multi-Clean Products, Inc. H20
United Floor Machine Company H24

Electric Hair & Hand Dryers (see Dryers)

Electric Heat Treating Furnaces (see Furnaces for Ceramics & Metals)

Electric Scoreboards & Timers
All-American Scoreboard Corp. G20
Brown Company, M. D. G21
Fair Play Mfg. Co. G22
International Business Machines Corp. C7/IBM
Medart Products, Inc. G10, 11
Naden & Sons Electric Scoreboard Co. G23

Electric Storage Batteries

Exide Industrial Div., Electric Storage Battery Co. C50
Graybar Electric Company, Inc. C51

Electric Time Systems (see Time Recorders, Stamps & Time-keeping Systems)

Electric Tools (see Tools—Electric)

Electric Typewriters (see Typewriters)

Electrical Measuring Instruments

Brown & Sharpe Mfg. Co. F37-40
General Electric Company F5-11
Graybar Electric Co., Inc. C51
Klett Manufacturing Co. F14, 15
Radio Corp. of America D1/RCA
Westinghouse Electric Corporation F1/We
Weston Electrical Instrument Corp. F17-20

Electronic Equipment

Brown & Sharpe Mfg. Co. F37-40
General Electric Company F5-11
Radio Corp. of America D1/RCA
Westinghouse Electric Corp. F1/We
Weston Electrical Instrument Corp. F17-20

Electrophoresis Apparatus

Klett Manufacturing Co. F14, 15

Elevator Door Sills (see Treads)

Elevators & Conveyors

Sedgwick Machine Works E32

Emergency Lighting Systems (see Lighting Systems—Emergency)

Exit Bolts & Fixtures

Vonnegut Hardware Co., Von Duprin Div. B56
Yale & Towne Mfg. Company B9/Ya

Exit Signs (see Signs)

Expansion Joint Material

Inland Steel Products Company B38
Jennison-Wright Corporation B1/Je

Fabrics—Plastics

Carpenter & Co., Inc. B3/Ca
Columbus Coated Fabrics Corp. A31

Fans—Exhaust & Ventilating

Laboratory Furniture Co., Inc. ... F22, 23
Metalab Equipment Corp. F2/Me
Swartwout Company C25

Fencing—Iron and Chain Link

Anchor Post Products, Inc. H25
Colorado Fuel & Iron Corp., Wickwire Spencer Steel Div. H26
Continental Steel Corporation H27
Cyclone Fence Dept., United States Steel Corporation H28
Stewart Iron Works Co., Inc. H30

Fenestration Systems (see Windows)

Field Houses & Gymnasium Construction

Macomber Incorporated A13
Rilco Laminated Products, Inc. .. A16, 17

Filing Cabinets

All-Steel Equipment Inc. D51
Anderson-Hickey Company D31
Art Metal Construction Co. D5/Ar
Diebold, Inc. D52, 53
General Fireproofing Company ... D5/Ge
Globe-Wernicke Co. D54, 55
Interior Steel Equipment Co. F55
Lyon Metal Products, Inc. F56, 57
Remington Rand D56, 57
Rowles Co. D47
Wood-Metal Industries, Inc. E3/Wo

Filing Stands—Rotary

Art Metal Construction Co. D5/Ar
Diebold, Inc. D52, 53
Globe-Wernicke Co. D54, 55
Remington Rand D56, 57

Filing Systems & Supplies

Art Metal Construction Co. D5/Ar
Diebold, Inc. D52, 53
Globe-Wernicke Co. D54, 55
International Business Machines Corp. C7/IBM
Remington Rand D56, 57

Filters—Suction, Acid-Proof

Knight, Maurice A. F2/Kn

Fire Doors

Cornell Iron Works, Inc. B44
Kinnear Manufacturing Co. B45
North American Iron & Steel Co., Inc. B48
Richards-Wilcox Mfg. Co. B52, 53
United States Plywood Corp. B49

Fire & Panic Exit Devices

Vonnegut Hardware Co., Von Duprin Div. B56

Fire Protection System

Grinnell Company C8

Fittings & Valves—Plumbing & Heating

Crane Co. C34, 35
Johnson Service Company C18, 19
Lawler Automatic Controls, Inc. C36
Powers Regulator Co. C3/Po
Symmons Engineering Company C37
Trane Company C28, 29

Flag Poles

North American Iron & Steel Co., Inc. H29
Stewart Iron Works Co., Inc. H30

Flameproof Stage Curtains (see Asbestos Curtains)

Floodlighting Equipment—Auditorium & Stage

Capitol Stage Lighting Co., Inc. D20
Century Lighting, Inc. D2/Ce
General Lighting Company, Inc. . D22, 23
Holophane Company, Inc. C46, 47
Kliegl Bros. D21

Floodlighting Equipment—Sports Area

Benjamin Electric Mfg. Co. .. C41, 42, 43
Crouse-Hinds Company G24
General Electric Company G25
Graybar Electric Company, Inc. C51
Holophane Company, Inc. C46, 47

Floor Brushes (see Brushes & Brooms)

Floor Cleaners, Finishes & Dressings

Continental Car-Na-Var Corp. H8
Empire Varnish Company H9
Fuller Brush Company H10
Hillyard Chemical Company H14, 15
Huntington Laboratories, Inc. H1/Hu; H21
Jennison-Wright Corporation B1/Je
Legge Company, Inc. H18
Multi-Clean Products, Inc. H20

Floor Construction

Natco Corporation B20
Robertson Company, H. H. A2/Ro

Floor Edgers

Clarke Sanding Machine Company ... H7
Holt Manufacturing Company H16

Floor Laying Systems

Loxit Systems, Inc. B15
Robertson Company, H. H. A2/Ro

Floor Machines—Scrubbing, Polishing

Advance Floor Machine Company H5
American Floor Surfacing Machine Co. H6
Clarke Sanding Machine Company H7
Continental Car-Na-Var Corp. H8
General Floorcraft, Inc. H11
Hild Floor Machine Company H12, 13
Holt Manufacturing Company H16
Huntington Laboratories, Inc. H1/Hu; H21
Kent Company, Inc. H17
Lincoln-Schlueter Floor Machinery Co. H19
Multi-Clean Products, Inc. H20
United Floor Machine Co., Inc. H24

Floor Maintenance—Slip-Resistant

Continental Car-Na-Var Corp. H8
Legge Company, Inc. H18
Multi-Clean Products, Inc. H20

Floor Mats

Melflex Products Company, Inc. B18

Floor Plates—Non-Slip

American Abrasive Metals Co. .. B12, 13
American Mason Safety Tread Co. .. B16
Wooster Products, Inc. B19

Floor Sanders

American Floor Surfacing Machine Co. H6
Clarke Sanding Machine Company .. H7
General Floorcraft, Inc. H11
Hild Floor Machine Company H12, 13
Holt Manufacturing Company H16
United Floor Machine Co., Inc. H24

Floor Seals (see Seals—Floor)

Floor Wax (see Waxes)

Flooring—Abrasive

Alberene Stone Corp. of Virginia ... A11
American Abrasive Metals Co. .. B12, 13
American Mason Safety Tread Co. .. B16
Melflex Products Company, Inc. B18
Wooster Products, Inc. B19

Flooring—Acid-Proof

Knight, Maurice A. F2/Kn
Natco Corporation B20
Tile-Tex Div., Flintkote Co. B17
United States Stoneware Co. F25

Flooring—Asphalt Tile, Plastic, etc.

Gold Seal Div., Congoleum Nairn, Inc. B14
Johns-Manville B25-28
Tile-Tex Div., Flintkote Co. B17
Uvalde Rock Asphalt Company .. B1/Uv

Flooring—Clay Tile

Metropolitan Brick, Inc. B3/Me
Mosaic Tile Company B22, 23
Natco Corporation B20
United States Ceramic Tile Co. B21

Flooring—Mastic Binder for

American Bitumuls & Alphalt Company H3/AmB
Zonolite Company A18

Flooring—Slate

Natural Slate Blackboard Co. B40
Pennsylvania Slate Producers Guild, Inc. B41

Flooring—Terrazzo

National Terrazzo & Tile Assn. B1/Na

Flooring—Wood

Jennison-Wright Corp. B1/Je

Fluorescent Lighting (see Lighting Fixtures—Fluorescent)

Fluorescent Lighting Glassware (see Lighting Fixtures)

Folding Bleachers (see Bleachers & Grandstands)

Folding Chairs (see Chairs—Folding)

Folding Doors

Carpenter & Co., Inc. B3/Ca

Folding Gates (see Gates—Iron & Wire)

Folding Tables (see Tables—Folding)

Food Carts (see Carts—Food Service)

Food Choppers (see Cutters—Food)

Food Service Equipment (see Cafeteria Equipment)

Food Storage Units—Hot & Cold

Anetsberger Brothers, Inc. E2/An
Blickman, Inc., S. E13
National Cornice Works E2/Na
Van Range Co., John E24

Foot Baths

American Playground Device Co. G28, 29
Recreation Equipment Corp. G31

Footlights

Century Lighting, Inc. D2/Ce
Kliegl Bros. D21

Fountains—Drinking

Century Brass Works, Inc. C32
Cordley & Hayes C33
Crane Co. C34, 35
Taylor Co., Halsey W. C38

Frames—Chalk & Bulletin Board

Behr Co., Herman G. 1210
Inland Steel Products Company B38
Rowles Co. B42

Freezers—Food Storage

General Electric Company E3/GE
Puffer-Hubbard Refrigerator Co. E19

Fryers and Fry Kettles

Anetsberger Brothers, Inc. E2/An

Fume Hoods—Ejectors, Laboratory

Duralab Equipment Corp. F24
Kewaunee Manufacturing Co. F2/Ke
Knight, Maurice A. F2/Kn
Laboratory Furniture Co., Inc. ... F22, 23
Metalab Equipment Corp. F2/Me
Natural Slate Blackboard Co. B40

Fund Raising Campaigns

American City Bureau B11

Furnaces for Ceramics & Metals

Electrikiln Div., Harrop Ceramic Service Co. F53
Pereny Equipment Company F54

Furniture—Classroom (see Chairs—Desks)

Furniture—Dormitory (see Dormitory Furniture)

Furniture—Home Economics (see Homemaking Furniture and Equipment)

Furniture—Laboratory (see Laboratory Furniture & Supplies)

Furniture—Multi-Purpose

Desco Corp. G3/De
General Fireproofing Company ... D5/Ge
Grogg Bros. Mfg. Co. D30
Haldeman-Homme Mfg. Co. E1/Ha
Howe Folding Furniture, Inc. D38
Metwood Mfg. Co. D3/Me
Midwest Folding Products D41
National School Furniture Co. ... D3/NaS
Rol-Fol Table, Inc. G1/Ro
Schieber Sales Company E1/Sc
Seat-Eat, Inc. E10, 11
Sico Mfg. Co., Inc. E12
Toledo Metal Furniture Co. D3/To

Furniture—Office & Library

All-Steel Equipment Inc. D51
American Seating Company D3/AmS
Anderson-Hickey Company D31
Arlington Seating Company D32, 33
Art Metal Construction Co. D5/Ar
Brunswick-Balke-Collender Co. D3/Br
General Fireproofing Company D5/Ge
General School Equipment Co. D42
Globe-Wernicke Co. D54, 55
Griggs Equipment Company D3/Gr
Heywood-Wakefield Co. D37
Ideal Seating Company D3/Id
Irwin Seating Company D40
Kewaunee Manufacturing Co. F2/Ke
Kuehne Mfg. Co. D3/Ku
National School Furniture Co. ... D3/NaS
Norcor Manufacturing Company D43
Remington Rand D56, 57
Rowles Co. D47
Toledo Metal Furniture Co. D3/To
Williams & Brower, Inc. D50

Furniture Casters, Cups & Glides

Bassick Company D3/Ba
Buckeye Glide Co., Inc. D35
Faultless Caster Corporation D36

Fuses

General Electric Company F5-11
Graybar Electric Co., Inc. C51
Westinghouse Electric Corporation . F1/We

Gages

Brown & Sharpe Mfg. Co. F37-40
Lufkin Rule Co. F30
Millers Falls Company F31
Starrett Company, L. S. F33
Westinghouse Electric Corporation. F1/We
Weston Electrical Instrument Corp. . F17-20

Galvanometers & Dynamometers

General Electric Company F5-11
Westinghouse Electric Corporation .F1/We
Weston Electrical Instrument Corp. . F17-20

Garbage & Waste Disposal Units

General Electric Company E3/GE
Morse Boulger Destructor Co. C31

Gas Burners (see Burners)

Gas Ovens and Ranges

Van Range Co., John E24

Gas Steam Heating

Clow & Sons, James B. C1/Cl

Gates—Iron & Wire

Anchor Post Products, Inc. H25
Colorado Fuel & Iron Corp., Wickwire Spencer Steel Div. H26
Continental Steel Corporation H27
Cornell Iron Works, Inc. B44
Cyclone Fence Dept., United States Steel Corporation H28
Kinnear Manufacturing Co. B45
North American Iron & Steel Co., Inc. . H29
Stewart Iron Works Co., Inc. H30

Generators

General Electric Company F5-11
Westinghouse Electric Corporation . F1/We

Glass—Plate
Libbey-Owens-Ford Glass Company A4/LOF

Glass—Structural
American 3 Way-Luxfer Prism Co. A3/AmT
Kimble Glass Co., Owens-Illinois . A20, 21
Libbey-Owens-Ford Glass Company A4/LOF
Pittsburgh Corning Corp. A19; A22

Glass Block for Windows and Walls
American 3 Way-Luxfer Prism Co. A3/AmT
Kimble Glass Co., Owens-Illinois . A20, 21
Pittsburgh Corning Corp. A19; A22

Glass—Insulating
Libbey-Owens-Ford Glass Company A4/LOF

Glass Structures
Aluminum Greenhouses, Inc. F26
Lord & Burnham F27

Glass Washing Machines
Universal Dishwashing Machinery Co. E22

Glasses—Drinking
Corning Glass Works E6, 7

Glazed Tile
Metropolitan Brick, Inc. B3/Me
Mosaic Tile Company B22, 23
Natco Corporation B20
United States Ceramic Tile Co. B21

Glides—Chair
Bassick Company D3/Ba
Buckeye Glide Co., Inc. D35
Faultless Caster Corporation D36

Grandstands
American Bridge (Div. United States Steel Corporation) G7
American Welding & Mfg. Co. .. G1/AmW
Berlin Chapman Company G1/Be
Castadia, Inc. G8
Horn Div., Brunswick-Balke-Collender Co. B5/Ho
Hussey Mfg. Co., Inc. G9
Long Island Bleacher Co., Inc. G12
Medart Products, Inc. G10, 11
Pittsburgh-Des Moines Steel Co. G13
Playtime Equipment Corp. G14
Safway Steel Products, Inc. G15
Sico Grandstands, Inc. G16
Universal Bleacher Company G17
Wayne Iron Works G18, 19

Greenhouses
Aluminum Greenhouses, Inc. F26
Lord and Burnham F27

Grilles—Metal Rolling
Cornell Iron Works, Inc. B44
Kinnear Manufacturing Co. B45
North American Iron & Steel Co., Inc. . B48

Grilles—Ornamental
General Bronze Corporation A4/Ge
North American Iron & Steel Co., Inc. H29

Grills & Griddles
Anetsberger Brothers, Inc. E2/An

Grinding Tools & Machines
Atlas Press Company F34, 35
Axelson Manufacturing Co. 1212
Boice-Crane Company F36
Brown & Sharpe Mfg. Co. F37-40
Cincinnati Lathe & Tool Co. F42, 43
Cincinnati Milling Machine Co. F3/Ci
Kearney & Trecker Corp. 1211
Millers Falls Company F31
Oliver Machinery Company F47
South Bend Lathe Works F49
U. S. Burke Machine Tool Div. F52
Walker-Turner Div., Kearney & Trecker Corp. F50, 51

Guards—Window (see Window Guards)

Gymnasium Equipment
American Playground Device Co. . G28, 29
Desco Corp. G3/De
General Playground Equipment, Inc.. G30
Medart Products, Inc. G10, 11
Recreation Equipment Corp. G31

Gymnasium Floor Maintenance
Continental Car-Na-Var Corp. H8
Empire Varnish Company H9
Hillyard Chemical Company H14, 15
Huntington Laboratories, Inc. H1/Hu; H21
Legge Company, Inc. H18

Gymnasium Flooring
Gold Seal Div., Congoleum Naim, Inc. B14
Jennison-Wright Corporation B1/Je
Johns-Manville B25-28
Tile-Tex Div., Flintkote Co. B17
Uvalde Rock Asphalt Company ... B1/Uv

Gymnasium Lighting
Benjamin Electric Mfg. Co. .. C41, 42, 43
Curtis Lighting, Inc. C44, 45
General Lighting Company, Inc. D22, 23
Guth Company, Edwin F. C48
Holophane Company, Inc. C46, 47
Thompson Electric Company C49

Gymnasium Lockers (see Lockers)

Gymnasium Seating
American Welding & Mfg. Co. .. G1/AmW
Berlin Chapman Company G1/Be
Horn Div., Brunswick-Balke-Collender Co. B5/Ho
Hussey Mfg. Co., Inc. G9
Ideal Seating Company D3/Id
Long Island Bleacher Co., Inc. G12
Medart Products, Inc. G10, 11
Playtime Equipment Corp. G14
Safway Steel Products, Inc. G15
Sico Grandstands, Inc. G16
Universal Bleacher Company G17
Wayne Iron Works G18, 19

Hack Saws, Blades & Frames
Millers Falls Company F31
Starrett Company, L. S. F33

Hair Dryers
Electric-Aire Engineering Corp. C39

Hammers (see Tools—Hand)

Hand Dryers
Electric-Aire Engineering Corp. C39

Hangers—Lighting Fixture
Thompson Electric Company C49

Hardware
Glynn-Johnson Corporation B9/Gl
Rixson Co., Oscar C. B9/Ri
Vonnegut Hardware Co., Von Duprin Div. B56
Yale & Towne Mfg. Company B9/Ya

Heating & Ventilating Equipment
American Air Filter Co., Inc.—Herman Nelson C1/Nel
Armstrong Machine Works C9
Babcock & Wilcox Company C10
Clow & Sons, James B. C1/Cl
Combustioneer Div., Steel Products Engineering Company C11
Crane Co. C34, 35
Cyclotherm Div., U. S. Radiator Corp. C12
Farrar & Trefts, Inc. C13
Fedders-Quigan Corporation C14
Gannon Co., Inc., Russell R. C15
International Boiler Works Co. C16
Jackson & Church C17
Johnson Service Company C18, 19
Johnston Brothers, Inc. C20
Nash Engineering Company C21
Nesbitt, Inc., John J. C1/Nes
Orr & Sembower, Inc. C24
Petro C22, 23
Smith Co., Inc., H. B. C1/Sm
Titusville Iron Works, Div. Struthers Wells Corp. C26, 27
Trane Company C28, 29
Will-Burt Company C30

Heating & Ventilating Equipment for Greenhouses
Aluminum Greenhouses, Inc. F26

Hedge Trimmers—Electric (see Lawn Mowers & Trimmers)

Herbarium Cases
Interior Steel Equipment Co. F55
Kewaunee Manufacturing Co. F2/Ke
Laboratory Furniture Co., Inc. ... F22, 23
Metalab Equipment Corp. F2/Me

Hinged Lighting Fixtures
General Lighting Company, Inc. .. D22, 23
Guth Co., Edwin F. C48
Thompson Electric Company C49

Hinges & Latches
Glynn-Johnson Corporation B9/Gl
Nelson Co., Inc., A. R. B51
Rixson Co., Oscar C. B9/Ri
Stanley Works B55
Yale & Towne Mfg. Company ... B9/Ya

Homemaking Furniture & Equipment
Coppes, Incorporated E25
Crane Co. C34, 35
General Electric Company E3/GE
Kewaunee Manufacturing Co. F2/Ke
Lyon Metal Products, Inc. F56, 57
Metalab Equipment Corp. F2/Me
Mutschler Brothers Company E3/Mu
Singer Sewing Machine Co. E26
White Sewing Machine Corporation E3/Wh
Wood-Metal Industries, Inc. E3/Wo

Honor Rolls
Behr Co., Herman G. 1210
Michaels Art Bronze Co., Inc. B57
Spencer Industries, Inc. B58
Stewart Iron Works Co. H30
United States Bronze Sign Co., Inc. .. B59

Hospital Equipment (see Infirmary Furniture and Supplies)

Humidity Control Systems

Armstrong Machine Works C9
Combustioneer Div., Steel Products Engineering Company C11
Johnson Service Company C18, 19
Lawler Automatic Controls, Inc. C36
Powers Regulator Co. C3/Po

Hypochlorite

Olin Mathieson Chemical Corporation G26

Illumination Control (see Switches & Panelboards—Lighting Control)

Incinerators

Morse Boulger Destructor Co. C31

Indices and Card Index Systems

Art Metal Construction Co. D5/Ar
Diebold, Inc. D52, 53
Globe-Wernicke Co. D54, 55
International Business Machines Corp. C7/IBM
Remington Rand D56, 57

Infirmary Furniture & Equipment

General Fireproofing Company ... D5/Ge
Simmons Company E28, 29
Superior Sleeprite Corp. E30, 31

Insect Cases

Kewaunee Manufacturing Co. F2/Ke
Laboratory Furniture Co., Inc. F22, 23
Metalab Equipment Corp. F2/Me

Instruments—Electrical

General Electric Company F5-11
Graybar Electric Co., Inc. C51
Klett Manufacturing Co. F14, 15
Westinghouse Electric Corporation . F1/We
Weston Electrical Instrument Corp. F17-20

Instruments—Switchboard

Adam Electric Co., Frank D16, 17
Federal Pacific Electric Co. F16
General Electric Company F5-11
Westinghouse Electric Corporation F1/We
Weston Electrical Instrument Corp. F17-20

Insulation

Johns-Manville B25-28
Zonolite Company A18

Intercommunication Systems

Bogen Company, Inc., David D8, 9
DuKane Corporation D10, 11
Graybar Electric Co., Inc. C51
Radio Corp. of America D1/RCA

Janitors' Supplies

Buckeye Glide Co., Inc. D35
Continental Car-Na-Var Corp. H8
Fuller Brush Company H10
Hillyard Chemical Company H14, 15
Huntington Laboratories, Inc. H1/Hu; H21
Legge Company, Inc. H18
Multi-Clean Products, Inc. H20
Nutting Truck & Caster Co. E17

Jars & Containers—Acid-Proof (see Acid Storage Containers & Cabinets)

Jointers—Woodworking

Atlas Press Company F34, 35
Boice-Crane Company F36
Duro Metal Products Company F41
Oliver Machinery Company F47
Powermatic Machine Co. F48
Walker-Turner Div., Kearney & Trecker Corp. F50, 51

Joists—Steel Bar

Laclede Steel Company A12
Macomber Incorporated A13
Truscon Steel Div., Republic Steel A28, 29

Kettles—Cooking

Aluminum Cooking Utensil Company E14, 15
Market Forge Company E2/Ma

Kilns (see Furnaces for Ceramics & Metals)

Kindergarten Furniture & Equipment

Desco Corp. G3/De
Educators Manufacturing Co. D3/Ed
Kuehne Mfg. Co. D3/Ku
School Interiors Co., Inc. D48

Kindergarten Nesting Cots

Pacific Shaw Company G4/Pa

Kitchen Equipment

Aluminum Cooking Utensil Company E14, 15
Anetsberger Brothers, Inc. E2/An
Blickman, Inc., S. E13
Boonton Molding Company E5
Cleveland Range Co. E16
Corning Glass Works E6, 7
Educators Furniture & Supply Co. Inc. D3/Ed
General Electric Company E3/GE
Keyes Fibre Sales Corporation E9
Market Forge Company E2/Ma
Toledo Scale Company E20
Triumph Mfg. Co. E21
Universal Dishwashing Machinery Co. E22
Universal Industries E23
Van Range Co., John E24

Kitchens—Homemaking

Coppes, Incorporated E25
Crane Co. C34, 35
General Electric Company E3/GE
Kewaunee Manufacturing Co. F2/Ke
Lyon Metal Products, Inc. F56, 57
Metalab Equipment Corp. F2/Me
Mutschler Brothers Company E2/Mu
Wood-Metal Industries, Inc. E3/Wo

Laboratory Apparatus, Instruments & Equipment

American Optical Company F12, 13
General Electric Company F5-11
Kewaunee Manufacturing Co. F2/Ke
Klett Mfg. Co. F14, 15
Knight, Maurice A. F2/Kn
Metalab Equipment Corp. F2/Me
Radio Corp. of America D1/RCA
United States Stoneware Co. F25
Westinghouse Electric Corporation F1/We
Weston Electrical Instrument Corp. F17-20

Laboratory Furniture

Duralab Equipment Corp. F24
General Fireproofing Company ... D5/Ge
Kewaunee Manufacturing Co. F2/Ke
Laboratory Furniture Co., Inc. ... F22, 23
Metalab Equipment Corp. F2/Me
Toledo Metal Furniture Co. D3/To

Laboratory Panels (see Switches & Panel Boards, Laboratory)

Laboratory Pipe—Acid-Resisting

Knight, Maurice A. F2/Kn
United States Stoneware Co. F25

Laboratory Reagents (see Reagents—Chemical)

Laboratory Scales (see Scales)

Laboratory Sinks (see Sinks—Laboratory)

Laboratory Stoneware

Alberene Stone Corp. of Virginia ... F21
Knight, Maurice A. F2/Kn
Metalab Equipment Corp. F2/Me
United States Stoneware Co. F25

Laboratory Switchboards (see Switches & Panel Boards—Laboratory)

Laminated Beams & Arches

Rilco Laminated Products, Inc. ... A16, 17

Laminated Plastics for Desk Tops, etc. (see Plastics—Laminated)

Lamps—Microscope

American Optical Company F12, 13

Lath—Metal

Inland Steel Products Company B38
Truscon Steel Div., Republic Steel A28, 29

Lathes—Machine Shop

Atlas Press Company F34, 35
Boice-Crane Company F36
Brown & Sharpe Mfg. Co. F37-40
Cincinnati Lathe & Tool Co. F42, 43
Duro Metal Products Company F41
LeBlond Machine Tool Co. F44
Logan Engineering Company F45
Niagara Machine & Tool Works F46
Oliver Machinery Company F47
South Bend Lathe Works F49
Walker-Turner Div., Kearney & Trecker Corp. F50, 51

Lathes—Metal Spinning

Oliver Machinery Company F47

Laundry Bleaching & Sterilizing Solution
Olin Mathieson Chemical Corporation G26

Laundry Equipment
General Electric Company E3/GE

Lavatories & Fixtures
Crane Co. C34, 35

Lawn Mowers & Trimmers
Devere Company H31
Eclipse Lawn Mower Co. H32
General Playground Equipment Inc. . G30
Gravely Tractors, Incorporated H33
Kut-Kwick Corp. H34

Leaf Pickup & Mill
Devere Company H31
Kut-Kwick Corp. H34
Gravely Tractors, Inc. H33

Letters & Signs
Behr Co., Herman G. 1210
Michaels Art Bronze Co., Inc. B57
Spencer Industries, Inc. B58
United States Bronze Sign Co., Inc. .. B59

Library Furniture (see Furniture —Office & Library)

Life Guard Chairs (see Chairs—Life Guard)

Lighting—Stage
Adam Electric Co., Frank D16, 17
Art Craft Theatre Equipment Co. D18
Capitol Stage Lighting Co., Inc. D20
Century Lighting, Inc. D2/Ce
General Lighting Company D22, 23
Kliegl Bros. D21
Knoxville Scenic Studios, Inc. D24
Novelty Scenic Studios, Inc. D2/No
Pittsburgh Stage, Inc. D25
Strong Electric Corporation D26
Weiss & Sons, I. D28, 29

Lighting Control (see Switches & Panel Boards—Lighting Control)

Lighting Fixture Maintenance Hangers
Thompson Electric Company C49

Lighting Fixtures—Fluorescent
Benjamin Electric Mfg. Co. .. C41, 42, 43
Curtis Lighting, Inc. C44, 45
General Lighting Company, Inc. D22, 23
Graybar Electric Co., Inc. C51
Guth Company, Edwin F. C48
Holophane Company, Inc. C46, 47
Sunbeam Lighting Company C5/Su

Lighting Fixtures—Incandescent
Curtis Lighting, Inc. C44, 45
General Lighting Company, Inc. .. D22, 23
Graybar Electric Company, Inc. C51
Holophane Company, Inc. C46, 47
Sunbeam Lighting Company C5/Su

Lighting Fixtures—Recessed
Curtis Lighting, Inc. C44, 45
General Lighting Company, Inc. D22, 23
Guth Company, Edwin F. C48
Holophane Company, Inc. C46, 47

Lighting Reflectors (see Reflectors—Lighting)

Lighting Standards (see Outdoor Lighting Standards)

Lighting Systems—Emergency
Exide Industrial Div., Electric Storage Battery Co. C50

Light-Proof Shade Cloth
Columbus Coated Fabrics Corp. A31
Forse Manufacturing Co. A32
Joanna Western Mills Company .. A5/Jo

Liquid Soaps & Dispensers (see Soaps & Dispensers)

Lock Mail Boxes
Federal Equipment Co. D5/Fe

Locker Locks (see Locks)

Lockers
All-Steel Equipment Inc. D51
Desco Corp. G3/De
General Fireproofing Company ... D5/Ge
Interior Steel Equipment Co. .. F55; B50
Lyon Metal Products, Inc. F56, 57
Medart Products, Inc. F58, 59
Mutschler Brothers Company E3/Mu
Stacor Equipment Co. F3/St
Star Steel Equipment Co., Inc. F61
Tolerton Company F3/To
Vogel-Peterson Company D3/Vo

Locks—Combination & Key
Dudley Lock Corporation F62
Master Lock Company F63
National Lock Company F64
Yale & Towne Mfg. Company ... B9/Ya

Longspans (see Roof Arches & Construction)

Loudspeakers
Radio Corp. of America D1/RCA
University Loudspeakers, Inc. D1/Un

Lounge Furniture
General Fireproofing Company ... D5/Ge
Simmons Company E28, 29
Superior Sleeprite Corp. E30, 31

Magnifiers
American Optical Company F12, 13

Mail Box Systems
Federal Equipment Co. D5/Fe

Mail Handling Equipment
Federal Equipment Company D5/Fe

Map Cloth
Holliston Mills, Inc. D61

Map Rail (see Trim)

Masonry Restoration & Cleaning
Horn Corporation, A. C. A8/Ho
Western Waterproofing Co., Inc. ... A34

Mats—Floor
Melflex Products Company, Inc. B18

Mattresses
Simmons Company E28, 29
Superior Sleeprite Corp. E30, 31

Measuring Tapes (see Rules & Measuring Tapes)

Meat Saws (see Cutters—Food)

Meat Tenderizers
Toledo Scale Company E20

Melting Pots for Metal, Lead & Tin
Perony Equipment Company F54

Memorial Plaques
Behr Co., Herman G. 1210
Michaels Art Bronze Co., Inc. B57
Spencer Industries Inc. B58
Stewart Iron Works Co. H30
United States Bronze Sign Co., Inc. . B59

Merry-Go-Rounds
American Playground Device Co. . B28, 29
Desco Corp. G3/De
General Playground Equipment Inc. .. G30
Recreation Equipment Corp. G31

Metal Weather Strips
Accurate Metal Weather Strip Co., Inc. A33

Metal Working Machinery
Atlas Press Company F34, 35
Axelson Manufacturing Co. 1212
Boice-Crane Company F36
Brown & Sharpe Mfg. Co. F37-40
Cincinnati Lathe & Tool Co. F42, 43
Cincinnati Milling Machine Co. ... F3/Ci
Kearney & Trecker Corp. 1211
LeBlond Machine Tool Co. F44
Logan Engineering Company F45
Niagara Machine & Tool Works F46
South Bend Lathe Works F49
U. S.-Burke Machine Tool Div. F52
Walker-Turner Div., Kearney & Trecker Corp. F50, 51

Meters—Laboratory, Research & Testing
General Electric Company F5-11
Graybar Electric Company, Inc. C51
Kiett Manufacturing Co. F14, 15
Radio Corp. of America D1/RCA
Westinghouse Electric Corporation . F1/We
Weston Electrical Instrument Corp. F17-20

Microfilming
Diebold, Inc. D52, 53

Micrometers
Brown & Sharpe Mfg. Co. F37-40
Lufkin Rule Co. F30
Millers Falls Company F31
Starrett Company, L. S. F33

Micro-Projectors
American Optical Company F12, 13

Microscope Lamps
American Optical Company F12, 13

Microscopes & Accessories
American Optical Company F12, 13
Radio Corp. of America D1/RCA

Microtome
American Optical Company F12, 13

Milling Machines
Atlas Press Company F34, 35
Axelson Manufacturing Co. 1212
Brown & Sharpe Mfg. Co. F37-40
Cincinnati Milling Machine Co. ... F3/Ci
Kearney & Trecker Corp. 1211
U. S.-Burke Machine Tool Div. F52

Mirrors—Dormitory
Carrom Industries, Inc. E27
Superior Sleeprite Corp. E30, 31

Mixers—Food
General Electric Company E3/GE
Triumph Mfg. Co. E21
Universal Industries E23

Mop Cleaners—Dry Vacuum
Spencer Turbine Company H23

Mop Trucks
Nutting Truck & Caster Company .. E17

Mops & Moppers—Floor
Fuller Brush Company H10

Motion Picture Equipment (see Projectors)

Motor Control Equipment—Laboratory
General Electric Company F5-11

Moulding
Inland Steel Products Company B38

Mowers—Gang Units
Devere Company H31
Gravely Tractors, Incorporated H33
Kut-Kwick Corporation H34

Mowers—Lawn (see Lawn Mowers & Trimmers)

Museum Cases (see Cases—Museum & Display)

Musical Instruments
Baldwin Piano Company D14, 15
Everett Piano Company D13

Name Plates
Michaels Art Bronze Co., Inc. B57
Spencer Industries Inc. B58
United States Bronze Sign Co., Inc. .. B59

Nesting Tables (see Tables—Stack)

Non-Slip Trowelling Compounds
American Abrasive Metals Co. .. B12, 13
American Bitumuls & Asphalt Company H3/AmB

Nurseries & Greenhouses
Aluminum Greenhouses, Inc. F26
Lord and Burnham F27

Office Furniture (see Furniture—Office and Library)

Office Machines
International Business Machines Corp. C7/IBM
National Cash Register Co. D60
Underwood Corporation D58, 59

Office Supplies
Diebold, Inc. D52, 53
Globe-Wernicke Co. D54, 55
National Cash Register Co. D60
Remington Rand D56, 57
Underwood Corporation D58, 59

Oil Burners
Babcock & Wilcox Company C10
Combustioneer Div., Steel Products Engineering Company C11
Farrar & Trefts, Inc. C13
International Boiler Works Co. C16
Jackson & Church C17
Johnston Brothers, Inc. C20
Orr & Sembower, Inc. C24
Petro C22, 23
Smith Co., Inc., H. B. C1/Sm
Titusville Iron Works, Div. Struthers Wells Corp. C26, 27

Optical Products
American Optical Company F12, 13

Orchestra Lifts
Knoxville Scenic Studios, Inc. D24

Organs, Symphonic
Baldwin Piano Company D14, 15

Oscillators
Radio Corp. of America D1/RCA

Oscillographs (see Recorders & Controllers)

Oscillometers (see Meters)

Ottomans (see Dormitory Furniture)

Outlet Plates & Boxes
Adams Electric Co., Frank D16, 17
Century Lighting, Inc. D2/Ce
Federal Pacific Electric Co. F16
General Electric Company F5-11
Graybar Electric Co., Inc. C51

Ovens—Electric
General Electric Company E3/GE
Graybar Electric Co., Inc. C51

Ovens—Gas
Van Range Co., John E24

Padlocks
Dudley Lock Corporation F62
Master Lock Company F63
National Lock Company F64
Yale & Towne Mfg. Co. B9/Ya

Paint—Cement, Protective, Rustproof and Wall
Empire Varnish Company H9
Standard Dry Wall Products A8/St

Paint—Interior, Exterior
Empire Varnish Company H9

Paint—Plastic
United States Stoneware Co. F25

Paint Products
Empire Varnish Company H9

Panel & Switchboard Instruments (see Switches & Panel Boards)

Paneling
Fiberesin Plastics Company D3/Fi
General Electric Company D3/GE
Johns-Manville B25-28
Martin-Parry Corporation B29
Mosaic Tile Company B22, 23
Natco Corporation B20
United States Ceramic Tile Co. B31
United States Plywood Corp. ... B43; 49

Panic Exit Devices
Vonnegut Hardware Co., Von Duprin Div. B56

Paper Dishes
Keyes Fibre Sales Corporation E9

Parking Meters
Michaels Art Bronze Co., Inc. B57

Partition Panels—Load Bearing
Macomber Incorporated A13
Natco Corporation B20

Partitions—Folding, Movable
Carpenter & Co., Inc. B3/Ca
Cornell Iron Works, Inc. B44
Fairhurst Co. Inc., John T. B30, 31
Horn Div., Brunswick-Balke-Collender Co. B5/Ho
Johns-Manville B25-28
Kinnear Manufacturing Co. B45
Martin-Parry Corporation B29
Mills Metal Compartment Co. B5/Mi
North American Iron & Steel Co., Inc. . B48
Richards-Wilcox Mfg. Co. B52, 53
United States Plywood Corp. B49
Wayne Iron Works B34, 35

Partitions—Glass Block
Kimble Glass Co., Owens-Illinois A20, 21
Pittsburgh Corning Corp. A19; 22

Partitions—Office & Classroom
Fairhurst Co. Inc., John T. B30, 31
Globe-Wernicke Co. D54, 55
Johns-Manville B25-28

Martin-Parry Corporation B29
Mills Metal Compartment Co. B5/Mi
Richards-Wilcox Mfg. Co. B52, 53
United States Plywood Corp. B49
Wayne Iron Works B34, 35

Partitions—Tile

Metropolitan Brick, Inc. B3/Me
Natco Corporation B20

Partitions—Toilet & Shower

Mills Metal Compartment Co. B5/Mi
Natural Slate Blackboard Co. B40
Pennsylvania Slate Producers Guild, Inc. B41
Sanymetal Products Co., Inc. B32, 33

Pavements, Walks, Treading, etc.

American Bitumuls & Asphalt Company H3/AmB
Zonolite Company A18

Peelers—Vegetable

Toledo Scale Company E20
Universal Industries E23

Pharmaceutical Laboratory Equipment

Klett Manufacturing Co. F14, 15

Phonographs (see Record Players)

Photoelectric Units

General Electric Company F5-11
Klett Manufacturing Co. F14, 15
Weston Electrical Instrument Corp. F17-20

Photoreproduction Equipment

Diebold, Inc. D52, 53
Remington Rand D56, 57

Piano Casters (see Casters)

Pianos

Baldwin Piano Company D14, 15
Everett Piano Company D13

Piling

Jennison-Wright Corporation B1/Je

Pipe & Fittings

Armstrong Machine Works C9
Century Brass Works, Inc. C32
Crane Co. C34, 35
Knight, Maurice A. F2/Kn

Pipe & Fittings—Acid-Proof

Knight, Maurice A. F2/Kn
United States Stoneware Co. F25

Pivot Hinges

Rixson Co., Oscar C. B9/Ri

Planers, Power-Shop

Boice-Crane Company F36
Oliver Machinery Company F47
Powermatic Machine Co. F48

Planes (see Tools)

Planfiles

Art Metal Construction Co. D5/Ar
Globe-Wernicke Co. D54, 55
Interior Steel Equipment Co. F55
Remington Rand D56, 57

Plaques—Wall

Behr Co., Herman G. 1210
Michaels Art Bronze Co., Inc. B57
Spencer Industries Inc. B58
Stewart Iron Works Co., Inc. H30
United States Bronze Sign Co., Inc. .. B59

Plaster Aggregate

Zonolite Company A18

Plastic Wall Coverings

Carpenter & Co., Inc. B3/Ca
Columbus Coated Fabrics Corp. A31

Plastics—Laminated, for Table, Counter & Desk Tops

Fiberesin Plastics Company D3/Fi
Formica Company D39
General Electric Company D3/GE
National School Furniture Co. D3/NaS

Plate Glass

Libbey-Owens-Ford Glass Company A4/LOF

Platforms & Stands—Folding (see Stands, Platforms & Stages—Folding)

Playground Equipment

American Playground Device Co. . G28, 29
Desco Corp. G3/De
General Playground Equipment Inc. .. G30
Medart Products, Inc. G10, 11
Recreation Equipment Corp. G31

Plumbing Supplies

Century Brass Works, Inc. C32
Crane Co. C34, 35
Lawler Automatic Controls, Inc. C36
Powers Regulator Co. C3/Po
Symmons Engineering Company C37

Polish—Furniture & Metal

Fuller Brush Company H10
Hillyard Chemical Company H14, 15

Polish—Porcelain (see Porcelain Polish)

Polishers—Floor (see Floor Machines)

Pool Cleaning Equipment (see Cleaners—Swimming Pool—Cleaning Equipment)

Popcorn Vending Machines

Cretors G1/Cr

Porcelain Polish

Hillyard Chemical Company H14, 15
Huntington Laboratories, Inc. H1/Hu; H21

Portable Bleachers (see Bleachers)

Portable Typewriters (see Typewriters)

Posts—Terminal

Anchor Post Products, Inc. H25
Colorado Fuel & Iron Corp., Wickwire Spencer Steel Div. H26
Continental Steel Corporation H27
Cyclone Fence Dept., United States Steel Corporation H28
Stewart Iron Works Co., Inc. H30

Potentiometers

General Electric Company F5-11
Klett Manufacturing Co. F14, 15
Westinghouse Electric Corporation F1/We
Weston Electrical Instrument Corp.. F17-20

Pots and Pans

Aluminum Cooking Utensil Company E14, 15

Potters Wheels

Electrikiln Div., Harrop Ceramic Service Co. F53
Pereny Equipment Company F54

Power Lawn Mowers

Devere Company H31
Eclipse Lawn Mower Co. H32
Gravely Tractors, Incorporated H33
Kut-Kwick Corporation H34

Power Sweepers

Gravely Tractors, Incorporated H33
Kut-Kwick Corporation H34

Power Ventilators

Knight, Maurice A. F2/Kn
Swartwout Company C25

Pressure Equalizers—Water

Lawler Automatic Controls, Inc. C36
Powers Regulator Co. C3/Po
Symmons Engineering Company C37

Program Clocks

International Business Machines Corp. C7/IBM
Montgomery Mfg. Co. C52
Simplex Time Recorder Co. C7/Si

Projection Instruments—Laboratory

American Optical Company F12, 13
Weston Electrical Instrument Corp. F17-20

Projectors—Motion Picture

Radio Corp. of America D1/RCA

Projectors—Opaque

American Optical Company D1/AO

Projectors—Slide & Film

American Optical Company D1/AO

Public Address Systems

Bogen Company Inc., David D8, 9
DuKane Corporation D10, 11
Graybar Electric Co., Inc. C51
Radio Corp. of America D1/RCA
University Loudspeakers, Inc. D1/Un

Pulleys for Lowering Lighting Fixtures
Thompson Electric Company C49

Pulverizers (see Destructors)

Pumps—Centrifugal
Nash Engineering Company C21

Pumps—Vacuum Heating
Nash Engineering Company C21

Racks—Basket, Gym, etc.
Interior Steel Equipment Co. F55
Medart Products, Inc. F58, 59
Pacific Shaw Company G4/Pa
Star Steel Equipment Co., Inc. F61

Racks—Bicycle (see Bicycle Racks)

Racks—Chart & Chalkboard
Pacific Shaw Company G4/Pa

Racks—Clothing
Desco Corp. G3/De
Nelson Company, Inc., A. R. B51
Vogel-Peterson Company D3/Vo

Racks for Mail Bags
Federal Equipment Co. D5/Fe

Racks—Tool
General Fireproofing Company ... D5/Ge
Lyon Metal Products, Inc. F56, 57
Standard Pressed Steel Co. F28

Radiator Panels & Cabinets
American Air Filter Co., Inc.—
Herman Nelson C1/Nel
Nesbitt, Inc., John J. C1/Nes
Trane Company C28, 29

Radiator Valves (see Valves—Radiator)

Radiators
American Air Filter Co., Inc.—
Herman Nelson C1/Nel
Clow & Sons, James B. C1/Cl
Fedders-Quigan Corporation C14
Nesbitt, Inc., John J. C1/Nes
Trane Company C28, 29

Radio Laboratory Equipment
General Electric Company F5-11
Radio Corp. of America D1/RCA
Weston Electrical Instrument Corp. F17-20

Radio & Television Broadcasting Equipment
Radio Corp. of America D1/RCA

Radios
Radio Corp. of America D1/RCA

Railings—Bronze, Metal, etc.
General Bronze Corporation A4/Ge
Michaels Art Bronze Co., Inc. B57
North American Iron & Steel Co., Inc. H29

Ranges—Electric
General Electric Company E3/GE
Graybar Electric Co., Inc. C51
Radio Corp. of America D1/RCA

Ranges—Gas
Van Range Co., John E24

Receptacles—Waste
Bennett Manufacturing Co. G5/Be
National Vulcanized Fibre Co. H22
United Metal Cabinet Corp. G32

Record Players
Bogen Company, Inc., David D8, 9
Califone Corporation D7
DuKane Corporation D10, 11
Radio Corp. of America D1/RCA

Record Systems
Art Metal Construction Co. D5/Ar
Diebold, Inc. D52, 53
Globe-Wernicke Co. D54, 55
International Business Machines . C7/IBM
Remington Rand D56, 57

Recorders—Tape, Wire, Discs
DuKane Corporation D10, 11
Radio Corp. of America D1/RCA

Recorders & Controllers—Temperature, CO_2, Voltage, etc.
General Electric Company F5-11
Graybar Electric Company Inc. C51
Klett Manufacturing Co. F14, 15
Westinghouse Electric Corporation F1/We
Weston Electrical Instrument Corp. F17-20

Recording Discs
Presto Recording Corporation D12

Records for Record Players
Presto Recording Corporation D12
Radio Corp. of America D1/RCA

Rectifiers & Rectifier Panels
General Electric Company F5-11
Graybar Electric Co., Inc. C51
Westinghouse Electric Corporation F1/We
Weston Electrical Instrument Corp.. F17-20

Reflectors—Lighting
Benjamin Electric Mfg. Co. .. C41, 42, 43
Century Lighting, Inc. D2/Ce
Curtis Lighting, Inc. C44, 45
General Lighting Company, Inc. . D22, 23
Graybar Electric Co., Inc. C51
Guth Company, Edwin F. C48
Holophane Company, Inc. C46, 47
Kliegl Bros. D21
Sunbeam Lighting Company C5/Su

Refrigerator Rack Equipment
Market Forge Company E2/Ma

Refrigerators
General Electric Company E3/GE
Puffer-Hubbard Refrigerator Co. E19

Regulators—Steam Temperature
American Air Filter Co., Inc.—
Herman Nelson C1/Nel
Armstrong Machine Works C9
Clow & Sons, James B. C1/Cl
Fedders-Quigan Corporation C14
Gannon Co., Inc., Russell R. C15
Johnson Service Company C18, 19
Lawler Automatic Controls, Inc. C36
Powers Regulator Co. C3/Po
Symmons Engineering Company C37

Relays
General Electric Company F5-11
Westinghouse Electric Corporation F1/We
Weston Electrical Instrument Corp.. F17-20

Remover—Varnish & Wax
Hillyard Chemical Company H14, 15
Legge Company, Inc. H18

Resistors
General Electric Company F5-11
Westinghouse Electric Corporation F1/We
Weston Electrical Instrument Corp. F17-20

Risers, Choral Stands
Haldeman-Homme Mfg. Co. E1/Ha
Horn Div., Brunswick-Balke-Collender Co. B5/Ho
Mitchell Mfg. Co. D44, 45, 46
Playtime Equipment Corp. G14
Sico Grandstands, Inc. G16

Roof Arches & Construction
Laclede Steel Company A12
Macomber Incorporated A13
Rilco Laminated Products, Inc. .. A16, 17

Roof Coatings
Barrett Div., Allied Chemical & Dye Corp. A14

Roof Insulation
Insulrock Corporation A15
Robertson Company, H. H. A2/Ro

Roof Panels—Glass Block
Kimble Glass Co., Owens-Illinois A20, 21
Pittsburgh Corning Corp. A22

Roof Slabs
Insulrock Corporation A15
Robertson Company, H. H. A2/Ro

Roof Trusses—Steel (see Roof Arches & Construction)

Roof Ventilators (see Ventilators—Roof)

Roofing
American Bitumuls & Asphalt Co. H3/AmB
American 3 Way-Luxfer Prism Co. A3/AmT
Barrett Div., Allied Chemical & Dye Corp. A14
Insulrock Corporation A15
Johns-Manville B25-28
Natural Slate Blackboard Co. B40
Pennsylvania Slate Producers Guild Inc. B41
Robertson Company, H. H. A2/Ro
Zonolite Company A18

Routers—Shapers
Duro Metal Products Co. F41
Miller Falls Company F31

Rug Shampooing Machines

Advance Floor Machine Company H5
American Floor Surfacing Machine Co. H6
Clarke Sanding Machine Company ... H7
Continental Car-Na-Var Corp. H8
General Floorcraft, Inc. H11
Hild Floor Machine Company ... H12, 13
Holt Manufacturing Company H16
Lincoln-Schlueter Floor Machinery Co. H19
Multi-Clean Products, Inc. H20
United Floor Machine Company, Inc. . H24

Rules & Measuring Tapes

Lufkin Rule Co. F30
Millers Falls Company F31
Stanley Tools F32
Starrett Company, L. S. F33

Runners—Safety Tread

Melflex Products Company, Inc. B18

Rustproof Paint (see Paints—Cement, Rustproof & Walls)

Safes

Diebold, Inc. D52, 53
Remington Rand D56, 57

Sanders

Atlas Press Company F34, 35
Boice-Crane Company F36
Clarke Sanding Machine Company ... H7
Duro Metal Products Company F41
Millers Falls Company F31
Oliver Machinery Company F47
Walker-Turner Div., Kearney & Trecker Corp. F50, 51

Sanders—Floor (see Floor Sanders)

Sash—Window & Door

Accurate Metal Weather Strip Co., Inc. A33
Adams & Westlake Company A4/Ad
Bayley Co., William A24, 25
Cupples Products Corporation A4/Cu
Flynn Manufacturing Co., Michael A26, 27
Marmet Corporation A4/Ma
Tuscon Steel Division, Republic Steel A28, 29
Trussbilt Div. of Siems Bros., Inc. B46, 47
Windalume Corporation A30

Saws—Band, Circular, Scroll, etc.

Atlas Press Company F34, 35
Boice-Crane Company F36
Duro Metal Products Company F41
Logan Engineering Company F45
Oliver Machinery Company F47
Starrett Company, L. S. F33
Walker-Turner Div., Kearney & Trecker Corp. F50, 51

Scaffolds

Safway Steel Products, Inc. G15

Scales

Toledo Scale Company E20

Scenery—Stage

Art Craft Theatre Equipment Co. ... D18
Knoxville Scenic Studios, Inc. D24
Novelty Scenic Studios, Inc. D2/No
Pittsburgh Stage, Inc. D25
Weiss and Sons, I. D28, 29

School Records & Forms (see Filing System & Supplies)

Scoreboards

All-American Scoreboard Corp. G20
Brown Company, M. D. G21
Fair Play Mfg. Co. G22
International Business Machines Corp. C7/IbM
Medart Products, Inc. G10, 11
Naden & Sons Electric Scoreboard Co. G23

Scoring & Analyzing Machines (see Test Scoring Machines)

Screwdrivers (see Tools—Hand)

Screw Machines

Brown & Sharpe Mfg. Co. F37-40

Scrubbing-Polishing Machines—Electric

Advance Floor Machine Co. H5
American Floor Surfacing Machine Co. H6
Clarke Sanding Machine Company ... H7
Continental Car-Na-Var Corp. H8
General Floorcraft, Inc. H11
Hild Floor Machine Company ... H12, 13
Holt Manufacturing Company H16
Huntington Laboratories, Inc.. H1/Hu;H21
Kent Company, Inc. H17
Lincoln-Schlueter Floor Machinery ... H19
Multi-Clean Products, Inc. H20
United Floor Machine Company, Inc. . H24

Seals—Floor

Continental Car-Na-Var Corp. H8
Empire Varnish Company H9
Hillyard Chemical Company H14, 15
Huntington Laboratories, Inc. H1/Hu; H21
Jennison-Wright Corporation B1/Je
Legge Company, Inc. H18
Multi-Clean Products, Inc. H20

Seating—Auditorium, Classroom, etc. (see Chairs)

Seating—Grandstand & Bleacher

American Bridge (Div. United States Steel Corporation) G7
American Welding & Mfg. Co. .. G1/AmW
Berlin Chapman Company G1/Be
Castadia Inc. G8
Horn Div., Brunswick-Balke-Collender Co. B5/Ho
Hussey Mfg. Co., Inc. G9
Long Island Bleacher Co., Inc. G12
Medart Products, Inc. G10, 11
Pittsburgh-Des Moines Steel Co. G13
Playtime Equipment Corp. G14
Safway Steel Products, Inc. G15
Sico Grandstands, Inc. G16
Universal Bleacher Company G17
Wayne Iron Works G18, 19

Sectional Laboratory Units

Kewaunee Manufacturing Co. F2/Ke
Laboratory Furniture Co., Inc. F22, 23
Metalab Equipment Corp. F2/Me

Seesaws

American Playground Device Co. G28, 29
Desco Corp. G3/De
General Playground Equipment Inc. . G30
Recreation Equipment Corp. G31

Settees—Campus & Park

American Playground Device Co. . G28, 29
Stewart Iron Works Co., Inc. H30

Sewing Machines

Singer Sewing Machine Co. E26
White Sewing Machine Corp. E3/Wh

Sewing Room Equipment

Coppes, Incorporated E25
Kewaunee Manufacturing Co. F2/Ke
Mutschler Brothers Company E3/Mu
Singer Sewing Machine Co. E26
Toledo Metal Furniture Co. D3/To
White Sewing Machine Corp. E3/Wh
Wood-Metal Industries, Inc. E3/Wo

Shades—Window

Columbus Coated Fabrics Corp. A31
Forse Manufacturing Company A32
Joanna Western Mills Company ... A5/Jo
Rowles Co. B42

Shapers

Atlas Press Company F34, 35
Axelson Manufacturing Co. 1212
Boice-Crane Company F36
Duro Metal Products Company F41
Logan Engineering Company F45
Oliver Machinery Company F47
South Bend Lathe Works F49
Walker-Turner Div., Kearney & Trecker Corp. F50, 51

Sheathing

Insulrock Corporation A15
Robertson Company, H. H. A2/Ro

Shelving—Acid-Proof

Alberene Stone Corp. of Virginia F21
Kewaunee Manufacturing Company F2/Ke
Knight, Maurice A. F2/Kn
Laboratory Furniture Co., Inc. ... F22, 23
Natural Slate Blackboard Co. B40
Pennsylvania Slate Producers Guild, Inc. B41

Shelving

Art Metal Construction Co. D5/Ar
General Fireproofing Company ... D5/Ge
Globe-Wernicke Co. D54, 55
Interior Steel Equipment Co. F55
Lyon Metal Products, Inc. F56, 57
Market Forge Company E2/Ma
Medart Products, Inc. F58, 59
Mutschler Brothers Company E3/Mu
Penn Metal Corp. of Penna. B41
Star Steel Equipment Co., Inc. F61

Shields for Lighting Fixtures

Benjamin Electric Mfg. Co. .. C41, 42, 43
Guth Company, Edwin F. C48

Shingles—Asbestos, Asphalt etc.

Johns-Manville B25-28

Shop Benches

Interior Steel Equipment Co. F55
Kewaunee Manufacturing Co. F2/Ke
Laboratory Furniture Co., Inc. .. F22, 23

Lyon Metal Products, Inc. F56, 57
Metalab Equipment Corp. F2/Me
Mutschler Brothers Company E3/Mu
Stacor Equipment Co. F3/St
Standard Pressed Steel Co. F28
Tolerton Company F3/To

Shop Equipment

Atlas Press Company F34, 35
Axelson Manufacturing Co. 1212
Boice-Crane Company F36
Brown & Sharpe Mfg. Co. F37-40
Cincinnati Lathe & Tool Co. F42, 43
Cincinnati Milling Machine Co. F3/Ci
Duro Metal Products Company F41
Electrikiln Div., Harrop Ceramic Service Co. F53
General Electric Company F5-11
Greenlee Tool Co. F29
Kearney & Trecker Corp. 1211
Klett Manufacturing Co. F14, 15
LeBlond Machine Tool Co. F44
Logan Engineering Company F45
Lufkin Rule Co. F30
Lyon Metal Products, Inc. F56, 57
Millers Falls Company F31
Niagara Machine & Tool Works F46
Oliver Machinery Company F47
Perony Equipment Company F54
Powermatic Machine Co. F48
South Bend Lathe Works F49
Standard Pressed Steel Co. F28
Stanley Tools F32
Starrett Company, L. S. F33
Toledo Metal Furniture Co. D3/To
U.S.-Burke Machine Tool Div. F52
Walker-Turner Div., Kearney & Trecker Corp. F50, 51
Westinghouse Electric Corporation F1/We
Weston Electrical Instrument Corp. F17-20

Shower Compartments

Natural Slate Blackboard Co. B40
Pennsylvania Slate Producers Guild, Inc. B41
Sanymetal Products Co., Inc. B32, 33

Shower Fittings

Lawler Automatic Controls, Inc. C36
Powers Regulator Co. C3/Po
Symmons Engineering Company C37

Shower Temperature Regulating Valves

Lawler Automatic Controls, Inc. C36
Powers Regulator Co. C3/Po
Symmons Engineering Company C37

Shutters—Fire; Upward Rolling Doors

Cornell Iron Works, Inc. B44
Kinnear Manufacturing Co. B45
North American Iron & Steel Co., Inc. B48

Signal Systems

Bogen Company, Inc., David D8, 9
DuKane Corporation D10, 11
Graybar Electric Co., Inc. C51
International Business Machines Corp. C7/IBM
Montgomery Mfg. Co. C32
Simplex Time Recorder Co. C7/Si

Signals—School Bus

Carolina Metal Products H35

Signs & Lettering

Behr Co., Herman G. 1210
Michaels Art Bronze Co., Inc. B57
Spencer Industries Inc. B58
United States Bronze Sign Co., Inc. .. B59

Signs & Tablets—Bronze (see Bronze Tablets & Signs)

Signs—Electric

Carolina Metal Products H35
Century Lighting, Inc. D2/Ce

Sills—Door & Window

Alberene Stone Corp. of Virginia A11
American Abrasive Metals Co. .. B12, 13
American Mason Safety Tread Co. .. B16
Inland Steel Products Company B38
Natural Slate Blackboard Co. B40
Pennsylvania Slate Producers Guild, Inc. B41
Wooster Products, Inc. B19

Silverware

International Silver Company E8
Oneida, Ltd. E18

Sink & Shelf Unit—Classroom

Educators Manufacturing Co. D3/Ed

Sinks—Kitchen

Blickman, Inc., S. E13
Crane Co. C34, 35
General Electric Company E3/GE
Kewaunee Manufacturing Co. F2/Ke
Lyon Metal Products, Inc. F56, 57
Van Range Co., John E24

Sinks—Laboratory

Alberene Stone Corp. of Virginia ... F21
Duralab Equipment Corp. F24
Kewaunee Manufacturing Co. F2/Ke
Knight, Maurice A. F2/Kn
Laboratory Furniture Co., Inc. .. F22, 23
Metalab Equipment Corp. F2/Me
Natural Slate Blackboard Co. B40
Pennsylvania Slate Producers Guild, Inc. B41
United States Stoneware Co. F25

Sinks—Lavatory

Crane Co. C34, 35

Skylights

American 3 Way-Luxfer Prism Co. A3/AmT
Kimble Glass Co., Owens-Illinois A20, 21
Pittsburgh Corning Corp. A22

Slate Chalkboards

Behr Co., Herman G. 1210
Natural Slate Blackboard Co. B40
Pennsylvania Slate Producers Guild, Inc. B41

Slicing Machines

Toledo Scale Company E20

Slide Films (see Films, Film Slides, Film Strips)

Slide Projectors (see Projectors —Slide & Film)

Slides—Playground

American Playground Device Co. G28, 29
Desco Corp. G3/De
General Playground Equipment Inc. . G30
Recreation Equipment Corp. G31

Snow Removal Equipment

Gravely Tractors, Incorporated H33
Kut-Kwick Corporation H34

Soaps

Hillyard Chemical Company ... H14, 15
Huntington Laboratories, Inc. H1/Hu; H21

Soapstone

Alberene Stone Corp. of Virginia ... A11

Sound Deadening Materials (see Acoustical Materials)

Sound Systems

Bogen Company, Inc., David D8, 9
Califone Corporation D7
DuKane Corporation D10, 11
Graybar Electric Company C51
Radio Corp. of America D1/RCA
University Loudspeakers, Inc. D1/Un

Spectrographic Equipment

American Optical Company F12, 13

Sports Timing Equipment

All-American Scoreboard Corp. G20
Brown Company, M. D. G21
Fair Play Mfg. Co. G22
International Business Machines Corp. C7/IBM
Medart Products, Inc. G10, 11
Naden & Sons Electric Scoreboard Co. G23

Spotlights

Capitol Stage Lighting Co., Inc. D20
Century Lighting, Inc. D2/Ce
Kliegl Bros. D21
Pittsburgh Stage, Inc. D25
Strong Electric Corporation D26
Weiss and Sons, I. D28, 29

Sprinklers—Automatic Fire

Grinnell Company C8

Stacks—Book

Art Metal Construction Co. D5/Ar
General Fireproofing Company .. D5/Ge
Globe-Wernicke Co. D54, 55
Interior Steel Equipment Co. F55
Remington Rand D56, 57
Star Steel Equipment Co., Inc. F61

Stadium Construction (see Grandstands)

Stadium Seat Brackets

Stewart Iron Works Co., Inc. H30

Stadium Seating (see Bleachers & Grandstands)

Stage Curtains (see Curtains & Draperies)

Stage Equipment—Electrical

Adam Electric Co., Frank D16, 17
Art Craft Theatre Equipment Co. D18
Century Lighting, Inc. D2/Ce
General Lighting Company D22, 23
Kliegl Bros. D21
Knoxville Scenic Studios Inc. D24
Novelty Scenic Studios, Inc. D2/No
Pittsburgh Stage, Inc. D25
Weiss and Sons, I. D28, 29

Stage Equipment, Rigging & Hardware

Art Craft Theatre Equipment Co. D18
Automatic Devices Company D19
Knoxville Scenic Studios Inc. D24
Novelty Scenic Studios, Inc. D2/No
Pittsburgh Stage, Inc. D25
Weiss and Sons, I. D28, 29

Stage Lighting Apparatus & Supplies

Adam Electric Co., Frank D16, 17
Art Craft Theatre Equipment Co. D18
Capitol Stage Lighting Co., Inc. D20
Century Lighting, Inc. D2/Ce
Federal Pacific Electric Co. F16
General Lighting Company, Inc. .. D22, 23
Kliegl Bros. D21
Knoxville Scenic Studios, Inc. D24
Novelty Scenic Studios, Inc. D2/No
Pittsburgh Stage, Inc. D25
Strong Electric Corporation D26
Ward Leonard Electric Co. D27
Weiss and Sons, I. D28, 29

Stage Props

Art Craft Theatre Equipment Co. D18
Knoxville Scenic Studios, Inc. D24
Weiss & Sons, I. D28, 29

Stage Scenery

Art Craft Theatre Equipment Co. D18
Knoxville Scenic Studios, Inc. D24
Novelty Scenic Studios, Inc. D2/No
Pittsburgh Stage, Inc. D25
Weiss and Sons, I. D28, 29

Stage Ventilators

Swartwout Company C25

Stages—Portable

Haldeman-Homme Mfg. Co. E1/Ha
Horn Div., Brunswick-Balke-Collender Co. B5/Ho
Metwood Mfg. Co. D3/Me
Mitchell Mfg. Co. D44, 45, 46
Playtime Equipment Corp. G14
Sico Grandstands, Inc. G16

Stair Treads—Non-Slip

Alberene Stone Corp. of Virginia A11
American Abrasive Metals Co. .. B12, 13
American Mason Safety Tread Co. .. B16
Melflex Products Company, Inc. B18
Wooster Products, Inc. B19

Stands—Tool (see Drill Stands)

Stands, Platforms & Stages Folding

Haldeman-Homme Mfg. Co. E1/Ha
Horn Div., Brunswick-Balke-Collender Co. B5/Ho
Mitchell Mfg. Co. D44, 45, 46
Playtime Equipment Corp. G14
Sico Grandstands, Inc. G16

Steam Cookers

Cleveland Range Co. E16
Market Forge Company E2/Ma

Steam Generators

Cyclotherm Div., U. S. Radiator Corp. C12
Titusville Iron Works-Div. Struthers Wells Corp. C26, 27

Steam Tables

Anetsberger Brothers, Inc. E2/An
Blickman, Inc., S. E13
National Cornice Works E2/Na
Van Range Co., John E24

Steam Traps

Armstrong Machine Works C9

Steel Flagpoles (see Flagpoles)

Steel Framing—Building

Macomber Incorporated A13

Steel Grandstands (see Grandstands)

Steel Roof Construction (see Roof Arches & Construction)

Stokers—Automatic

Combustioneer Div., Steel Products Engineering Company C11
Will-Burt Company C30

Stone—Architectural

Alberene Stone Corp. of Virginia A11

Stoneware—Acid-Proof

Alberene Stone Corp. of Virginia F21
Knight, Maurice A. F2/Kn
United States Stoneware Co. F25

Stools

Lyon Metal Products, Inc. F56, 57
Standard Pressed Steel Co. F28
Toledo Metal Furniture Co. D3/To
Tolerton Company F3/To

Stop Signals

Carolina Metal Products H35

Storage Batteries

Exide Industrial Div. Electric Storage Battery Co. C50
Graybar Electric Co., Inc. C51

Storage Counters—Cubicles—Classroom

Educators Manufacturing Co. D3/Ed

Stoves (see Ranges)

Structural Slabs

Insulrock Corporation A15
Robertson Co., H. H. A2/Ro

Structural Tile

Metropolitan Brick, Inc. B3/Me
Mosaic Tile Company B22, 23
Natco Corporation B20
United States Ceramic Tile Co. B21

Student Record Reproduction Equipment (see Photo-reproduction Equipment)

Student Records (see Record Systems)

Sumps & Catch Basins—Acid-Proof

Alberene Stone Corp. of Virginia F21
Knight, Maurice A. F2/Kn
United States Stoneware Co. F25

Surfacing Tennis Courts, Walks, etc.

American Bitumuls & Asphalt Company H3/AmB

Sweepers—Power

Gravely Tractors, Incorporated H33
Kut-Kwick Corporation H34

Swimming Pool Chlorination

Olin Mathieson Chemical Corporation G26
Wallace & Tiernan G27

Swimming Pool Cleaning Equipment

American Playground Device Co. G28, 29
General Playground Equipment Inc. .. G30
Olin Mathieson Chemical Corporation G26
Spencer Turbine Company H23

Swimming Pool Equipment

American Playground Device Co. G28, 29
Desco Corp. G3/De
General Playground Equipment Inc. .. G30
Hussey Mfg. Co., Inc. G9
Recreation Equipment Corp. G31

Swings

American Playground Device Co. G28, 29
Desco Corp. G3/De
General Playground Equipment Inc. .. G30
Recreation Equipment Corp. G31

Switches & Panelboards—Fire-Signal, Sound, etc.

Bogen Company, Inc., David D8, 9
DuKane Corporation D10, 11
International Business Machines Corp. C7/IBM
Radio Corp. of America D1/RCA
University Loudspeakers, Inc. D1/Un

Switches & Panelboards—Laboratory

Federal Pacific Electric Co. F16
General Electric Company F5-11
Westinghouse Electric Corporation F1/We
Weston Electrical Instrument Corp. F17-20

Switches & Panel Boards—Lighting Control

Adam Electric Co., Frank D16, 17
Century Lighting, Inc. D2/Ce
Federal Pacific Electric Co. F16
Kliegl Bros. D21
Ward Leonard Electric Co. D27

Table Tops (see Tops—Counter, Table & Desk)

Table Trucks (see Truck—Table, Chair, etc.

Tables—All Purpose

All-Steel Equipment Inc. D51
American Seating Company D3/AmS
Arlington Seating Company D32, 33
Brewer-Titchener Corporation D34
Brunswick-Balke-Collender Co. D3/Br
General Fireproofing Company .. D5/Ge
Globe-Wernicke Co. D54, 55
Griggs Equipment Company D3/Gr
Grogg Bros. Mfg. Co. D30
Haldeman-Homme Mfg. Co. E1/Ha
Howe Folding Furniture, Inc. D38
Irwin Seating Company D40
Kewaunee Manufacturing Co. F2/Ke
Kuehne Mfg. Co. D3/Ku
Midwest Folding Products D41
Mitchell Mfg. Co. D44, 45, 46
Mutschler Brothers Co. E3/Mu
National School Furniture Co. ... D3/NaS
Rol-Fol Table Inc. E1/Ro
Rowles Co. D47
Schieber Sales Company E1/Sc
School Interiors Co. Inc. D48
Seat-Eat, Inc. E10, 11
Sico Manufacturing Co. Inc. E12
Toledo Metal Furniture Co. D3/To
Virco Mfg. Corporation D3/Vi

Tables—Art & Drafting

Coppes, Incorporated E25
General Fireproofing Company .. D5/Ge
Interior Steel Equipment Co. F55
Kewaunee Manufacturing Co. F2/Ke
Lyon Metal Products, Inc. F56, 57
Metalab Equipment Corp. F2/Me
Mutschler Brothers Co. E3/Mu
Stacor Equipment Co. F3/St
Telerton Company F3/To

Tables—Banquet (see Banquet Tables)

Tables—Cafeteria

American Seating Company D3/AmS
General Fireproofing Company .. D5/Ge
Griggs Equipment Co. D3/Gr
Grogg Bros. Mfg. Co. D30
Haldeman-Homme Mfg. Co. E1/Ha
Howe Folding Furniture, Inc. D38
Kuehne Mfg. Co. D3/Ku
Metwood Mfg. Co. D3/Me
Mitchell Mfg. Co. D44, 45, 46
National School Furniture Co. ... D3/NaS
Rol-Fol Table, Inc. E1/Ro
Schieber Sales Company E1/Sc
Seat-Eat, Inc. E10, 11
Sico Manufacturing Co. Inc. E12
Toledo Metal Furniture Co. D3/To

Tables—Dormitory

Carrom Industries, Inc. E27
General Fireproofing Company ... D5/Ge
Kuehne Mfg. Co. D3/Ku
Simmons Company E28, 29

Tables—Folding

Brewer-Titchener Corporation D34
Grogg Bros. Manufacturing Co. D30
Haldeman-Homme Mfg. Co. E1/Ha
Howe Folding Furniture, Inc. D38
Metwood Mfg. Co. D3/Me
Midwest Folding Products D11
Mitchell Mfg. Co. D44, 45, 46
Mutschler Brothers Company E3/Mu
Rol-Fol Table, Inc. E1/Ro
Schieber Sales Company E1/Sc
Seat-Eat, Inc. E10, 11
Shwayder Bros. Inc. D3/Sh
Sico Manufacturing Co. Inc. E12
Virco Mfg. Corporation D3/Vi

Tables—Kindergarten

Educators Furniture Supply Co. Inc. D3/Ed
Kuehne Mfg. Co. D3/Ku
Mitchell Mfg. Co. D44, 45, 46
Telerton Company F3/To

Tables—Kitchen

Blickman, Inc. S. E13
Coppes, Incorporated E25
General Electric Company E3/GE
Kuehne Mfg. Co. D3/Ku
Mutschler Brothers Company E-3/Mu
National School Furniture Co. ... D3/NaS
Universal Industries E23
Wood-Metal Industries, Inc. E3/Wo

Tables—Laboratory & Shop

Duralab Equipment Corp. F24
General Fireproofing Company ... D5/Ge
Kewaunee Manufacturing Co. F2/Ke
Laboratory Furniture Co., Inc. .. F22, 23
Lyon Metal Products, Inc. F26, 27
Metalab Equipment Corp. F-2/Me
National School Furniture Co. ... D3/NaS
Toledo Metal Furniture Co. D3/To

Tables—Library

All-Steel Equipment Inc. D51
Anderson-Hickey Co. D31
General Fireproofing Company .. D5/Ge
Kuehne Mfg. Co. D3/Ku
Metwood Mfg. Co. D3/Me
Remington Rand D56, 57

Tables—Mail Sorting

Federal Equipment Co. D5/Fe
Toledo Metal Furniture Co. D3/To

Tables—Picnic

American Playground Device Co. G28, 29

Tables—Round

Brewer-Titchener Corp. D34
Brunswick-Balke-Collender Co. D3/Br
Educators Manufacturing Co. D3/Ed
General Fireproofing Company .. D5/Ge
Globe-Wernicke Co. D54, 55
Griggs Equipment Company D3/Gr
Kuehne Mfg. Co. D3/Ku
Midwest Folding Products D41
Mitchell Mfg. Co. D44, 45, 46
Mutschler Brothers Co. E3/Mu
National School Furniture Co. ... D3/NaS
Virco Mfg. Corporation D3/Vi

Tables—Sewing & Cutting (see Sewing Room Equipment)

Tables—Stack

Brunswick-Balke-Collender Co. ... D3/Br
General Fireproofing Company .. D5/Ge
School Interiors Co., Inc. D48

Tables—Steam (see Steam Tables)

Tables—Tennis

Metwood Mfg. Co. D3/Me
Sico Manufacturing Co. Inc. E12

Tablet Arm Chairs

American Seating Company .... D3/Am S
Arlington Seating Company D32, 33
Brunswick-Balke-Collender Co. ... D3/Br
General Fireproofing Company .. D5/Ge
General School Equipment Co. D42
Griggs Equipment Co. D3/Gr
Heywood-Wakefield Company D37
Ideal Seating Co. D3/Id
Irwin Seating Company D40
Kuehne Mfg. Co. D3/Ku
Norcor Manufacturing Company ... D43
Rowles Co. D47
Toledo Metal Furniture Co. D3/To
Virco Mfg. Corporation D3/Vi
Westmoreland Mfg. Corp. D3/We
Williams & Brower, Inc. D50

Tablets—Memorial

Behr Co., Herman G. 1210
Michaels Art Bronze Co., Inc. B57
Spencer Industries Inc. B58
Stewart Iron Works Co., Inc. H30
United States Bronze Sign Co., Inc. .. B59

Tableware—Dishes

Boonton Molding Company E5
Corning Glass Works E6, 7
Keyes Fibre Sales Corporation E9

Tableware—Silver

International Silver Company E8
Oneida, Ltd. E18

Tabulating & Sorting Machines

International Business Machines Corp. C7/IBM

Tackboard Material

Carpenter & Co., Inc. B3/Ca

Tackboards

Bangor Cork Co. B6/Ba
Behr Co., Herman G. 1210
Claridge Products & Equipment, Inc. B37
Jecmen Company B39
Loxit Systems, Inc. B15
Rowles Co. B42
Spencer Industries, Inc. B58
United States Plywood Corp. B43

Tanks—Acid & Chemical Resistant

Alberene Stone Corp. of Virginia ... F21
Knight, Maurice A. F2/Kn
Laboratory Furniture Co., Inc. .. F22, 23
Metalab Equipment Corp. F2/Me
United States Stoneware Co. F25

Tape Recorders

DuKane Corporation D10, 11
Radio Corp. of America D1/RCA

Teaching Aids, Films & Booklets

Axelson Manufacturing Co. 1212
Cincinnati Milling Machine Co. ... F3/Ci
DuKane Corp. D10, 11
General Electric Co. F5-11
Kearney & Trecker Corp. 1211
Radio Corp. of America D1/RCA

South Bend Lathe Works F49
Stanley Tools F32
Starrett Company, L. S. F33
Walker-Turner Div. Kearney & Trecker Corp. F50, 51

Television

Radio Corp. of America D1/RCA

Temperature Indicating Instruments

Weston Electrical Instrument Corp. F17-20

Temperature Regulating Systems

American Air Filter Co., Inc.—Herman Nelson C1/Nel
Armstrong Machine Works C9
Clow & Sons, James B. C1/Cl
Gannon Co., Inc., Russell R. C15
Johnson Service Company C18, 19
Lawler Automatic Controls, Inc. C36
Powers Regulator Co. C3/Po
Trane Company C28, 29

Temperature Regulators—Showers, Steam Tables, Oil Preheaters, etc.

Anetsberger Brothers, Inc. E2/An
Armstrong Machine Works C9
Lawler Automatic Controls, Inc. C36
Powers Regulator Co. C3/Po
Symmons Engineering Company C37

Tennis Court Backstops (see Backstops)

Tennis Court Backstops (see Surfacing Tennis Courts, etc.)

Terminal Posts

Anchor Post Products, Inc. H25
Colorado Fuel & Iron Corp., Wickwire Spencer Steel Div. H26
Continental Steel Corporation H27
Cyclone Fence Dept., United States Steel Corporation H28
Stewart Iron Works Co., Inc. H30

Terrazzo

National Terrazzo & Tile Assn. ... B1/Na

Testing Equipment—Electrical (see Electrical Measuring Instruments)

Test Scoring Machines

International Business Machines Corp. C7/IBM

Textbook Bindings

Holliston Mills, Inc. D61

Theatrical Equipment

Adam Electric Co., Frank D16, 17
Art Craft Theatre Equipment Co. ... D18
Automatic Devices Company D19
Century Lighting, Inc. D2/Ce
Kliegl Bros. D21
Knoxville Scenic Studios Inc. D24
Novelty Scenic Studios, Inc. D2/No
Pittsburgh Stage, Inc. D25
Ward Leonard Electric Co. D27
Weiss and Sons, I. D28, 29

Thermocouples

General Electric Co. F5-11
Weston Electrical Instrument Corp. F17-20

Thermometers—Electrical Resistance

Weston Electrical Instrument Corp. F17-20

Thermostats—Heating & Ventilating

Johnson Service Company C18, 19
Lawler Automatic Controls, Inc. C36
Powers Regulator Co. C3/Po

Thresholds (see Sills—Door & Window)

Tile—Acoustical

Celotex Corporation B4
Dant & Russell Sales Co. B4/Da
Johns-Manville B25-28

Tile—Asphalt

Gold Seal Div., Congoleum Nairn, Inc. B14
Johns-Manville B25-28
Tile-Tex Div. Flintkote Co. B17
Uvalde Rock Asphalt Company ... B1/Uv

Tile—Flooring (see Flooring—Tile)

Tile—Glazed (see Glazed—Tile)

Tile—Plastic

Gold Seal Div., Congoleum Nairn, Inc. B14
Johns-Manville B25-28
Tile-Tex Div. Flintkote Co. B17
Uvalde Rock Asphalt Company ... B1/Uv

Tile—Rubber

Gold Seal Div., Congoleum Nairn, Inc. B14

Tile—Structural (see Structural Tile)

Tile—Wall

Gold Seal Div., Congoleum Nairn, Inc. B14
Johns-Manville B25-28
Metropolitan Brick, Inc. B3/Me
Mosaic Tile Company B22, 23
Natco Corporation B20
Tile-Tex Div. Flintkote Co. B17
United States Ceramic Tile Co. B21

Tile Cleaners

Hillyard Chemical Company H14, 15
Huntington Laboratories, Inc. H1/Hu; H21

Time Recorders, Stamps & Timekeeping Systems

International Business Machines Corp. C7/IBM
Simplex Time Recorder Co. C7/Si

Timers—Electric Sports

All-American Scoreboard Corp. G20
Brown Company, M. D. G21
Fair Play Mfg. Co. G22
International Business Machines Corp. C7/IBM
Medart Products, Inc. G10, 11
Naden & Sons Electric Scoreboard Co. G23

Toilet Compartments

Natural Slate Blackboard Co. B40
Pennsylvania Slate Producers Guild Inc. B41
Sanymetal Products Co., Inc. B32, 33

Tool Sets—Student (see Tools—Hand)

Tool Storage Bins & Cabinets

Lyon Metal Products, Inc. B56, 57
Stacor Equipment Co. F3/St
Tolerton Company F3/To

Tools—Hand

Greenlee Tool Co. F29
Lufkin Rule Co. F30
Millers Falls Company F31
Stanley Tools F32
Starrett Company F33

Tools—Machine

Atlas Press Company F34, 35
Axelson Manufacturing Co. 1212
Boice-Crane Co. F36
Brown & Sharpe Mfg. Co. F37-40
Cincinnati Lathe & Tool Co. F42, 43
Duro Metal Products Company F41
Kearney & Trecker Corp. 1211
LeBlond Machine Tool Co. F44
Logan Engineering Company F45
Niagara Machine & Tool Works F46
Oliver Machinery Company F47
South Bend Lathe Works F49
U.S. Burke Machine Tool Div. F32
Walker-Turner Div., Kearney & Trecker Corp. F50, 51

Tools—Portable, Electric

Millers Falls Company F31

Top Lighting

American 3 Way-Luxfer Prism Co. A3/AmT
Kimble Glass Co., Owens-Illinois A20, 21
Pittsburgh Corning Corp. A22

Tops—Counter, Furniture, etc.

Alberene Stone Corp. of Virginia ... F21
Fiberesin Plastics Company D3/Fi
Formica Company D39
General Electric Company D3/GE
Metalab Equipment Corp. F2/Me
National School Furniture Co. .. D3/NaS
Natural Slate Blackboard Co. B40
Pennsylvania Slate Producers Guild Inc. B41
Tolerton Company F3/To
United States Plywood Corp. C43
Van Range Co., John E24
Wood-Metal Industries, Inc. E3/Wo

Towers—Floodlight, Radio, Maintenance

Safway Steel Products, Inc. G15
Truscon Steel Div., Republic Steel A28, 29

Tracing Cloths

Holliston Mills, Inc. D61

Tracks for Doors
Richards-Wilcox Mfg. Co. B52, 53

Tractors
Gravely Tractors, Incorporated H33
Kut-Kwick Corporation H34

Transcription Players
Begen Company, Inc., David D8, 9
Califone Corporation D7
DuKane Corporation D10, 11
Radio Corp. of America D1/RCA

Transformers
General Electric Company F5-11
Graybar Electric Co., Inc. C51
Radio Corp. of America D1/RCA
Westinghouse Electric Corporation F1/We
Weston Electrical Instrument Corp. F17-20

Trays—Dish, Food, etc.
Aluminum Cooking Utensil Company E14, 15
Boonton Molding Company E5
Keyes Fibre Sales Corporation E9

Treads—Stair & Floor
Alberene Stone Corp. of Virginia ... A11
American Abrasive Metals Co. .. B12, 13
American Mason Safety Tread Co. ... B16
Melflex Products Company, Inc. B18
Wooster Products, Inc. B19

Trim for Bulletin & Chalkboards Maprails, etc.
Behr Co., Herman G. 1210
Claridge Products & Equipment, Inc. B37
Inland Steel Products Company B38
Loxit Systems, Inc. B15
Rowles Co. B42
United States Plywood Corp. B43

Trim for Doors, Windows, Corners, etc.
Inland Steel Products Company B38
Truscon Steel Div., Republic Steel A28, 29
Trussbilt Div. of Sioms Bros. Inc. B46, 47

Troughs & Trim—Chalkboard (see Chalkboard Troughs & Trim)

Troughs—Laboratory
Alberene Stone Corp. of Virginia ... F21
Duralab Equipment Corp. F24
Knight, Maurice A. F2/Kn
Laboratory Furniture Co., Inc. ... F22, 23
Metalab Equipment Corp. F2/Me
United States Stoneware Co. F25

Trucks—Table, Chair, Books, Tools, etc.
Brewer-Titchener Corporation D34
Educators Manufacturing Co. D3/Ed
Grogg Bros. Mfg. Co. D30
Lyon Metal Products, Inc. F56, 57
Metwood Mfg. Co. D3/Me
Midwest Folding Products D41
Mitchell Mfg. Co. D44, 45, 46
Nutting Truck and Caster Co. E17
Pacific Shaw Company G4/Pa
Standard Pressed Steel Co. F28
Toledo Metal Furniture Co. D3/To

Trucks—Food Service (see Carts)

Trusses—Bowstring
Macomber Incorporated A13
Rilco Laminated Products, Inc. .. A16, 17

Tubes—Electron & Radio
General Electric Company F5-11
Graybar Electric Company C51
Radio Corp. of America D1/RCA

Tubing—Plastic
United States Stoneware Co. F25

Tubs—Acid-Proof
Alberene Stone Corp. of Virginia ... F21
Knight, Maurice A. F2/Kn
Laboratory Furniture Co., Inc. .. F22, 23
United States Stoneware Co. F25

Typewriter Desks & Tables
General Fireproofing Company .. D5/Ge
Toledo Metal Furniture Co. D3/To
Virco Mfg. Corporation D3/Vi

Typewriters
International Business Machines Corp. C7/IBM
Remington Rand D56, 57
Underwood Corporation D58, 59

Umbrella Racks
Vogel-Peterson Company D3/Vo

Unit Heaters & Ventilators
American Air Filter Co. Inc.—Herman Nelson C1/Nel
Farrar & Trefts, Inc. C13
Fedders-Quigan Corporation C14
Gannon Co., Inc., Russell R. C15
Jackson & Church C17
Nesbitt, Inc. C1/Nes
Trane Company C28, 29

Upholstering Material
Carpenter & Co., Inc. B3/Ca

Urinals
Crane Co. C34, 35

Urns—Coffee (see Coffee Urns)

Utensils—Cooking (see Cooking Equipment & Utensils)

Vacuum Cleaners—Wet & Dry
American Floor Surfacing Machine Co. H6
Clarke Sanding Machine Company .. H7
Continental Car-Na-Var Corp. H8
General Floorcraft, Inc. H11
Hild Floor Machine Company .. H12, 13
Holt Manufacturing Company H16
Kent Company, Inc. H17
Lincoln-Schlueter Floor Machinery Co. H19
Multi-Clean Products, Inc. H20
Spencer Turbine Company H23
United Floor Machine Company, Inc. H24

Vacuum Cleaning System
Spencer Turbine Company H23

Vacuum Heating Pumps (see Pumps—Vacuum Heating)

Valves—Temperature Regulating
Armstrong Machine Works C9
Johnson Service Company C18, 19
Lawler Automatic Controls, Inc. C36
Powers Regulator Co. C3/Po
Symmons Engineering Company C37

Valves—Thermostatic Shower Mixing
Armstrong Machine Works C9
Lawler Automatic Controls, Inc. C36
Powers Regulator Co. C3/Po
Symmons Engineering Company ... C37

Valves & Fittings (see Fittings & Valves)

Varnish
Empire Varnish Company H9
Hillyard Chemical Company H14, 15

Vaults
Diebold, Inc. D52, 53

Vegetable Peelers (see Peelers—Vegetable)

Vending Machines—Popcorn
Cretors G1/Cr

Venetian Blinds
Kirsch Company A6/Ki
Levolor Lorentzen, Inc. A6/Le
Rowles Co. B42

Ventilating Pipe & Fittings
Knight, Maurice A. F2/Kn
Laboratory Furniture Co., Inc. ... F22, 23
Metalab Equipment Corp. F2/Me

Ventilating Units
American Air Filter Co. Inc.—Herman Nelson C1/Nel
Gannon Co., Inc., Russell R. C15
Jackson & Church C17
Nesbitt, Inc. C1/Nes
Trane Company C28, 29

Ventilators—Glass Block
American 3 Way-Luxfer Prism Co. A3/AmT
Marmet Corporation A4/Ma

Ventilators—Roof
American 3 Way-Luxfer Prism Co. A3/AmT
Knight, Maurice A. F2/Kn
Swartwout Company C25

Ventilators—Stage
American 3 Way-Luxfer Prism Co. A3/AmT
Swartwout Company C25

Vises
Brown & Sharpe Mfg. Co. F37-40

Visible Record Forms and Equipment (see Record Systems)

Voltage Regulators (see Dimmers)

Voltmeters (see Meters)

Wainscoting
Alberene Stone Corp. of Virginia .. A11
Carpenter & Co., Inc. B3/Ca
Fiberesin Plastics Co. D3/Fi
Tile-Tex Div. Flintkote Co. B17

Walks, Pavements, Treading, etc. (see Pavements, Walks, etc.)

Wall Clocks (see Clocks)

Wall Coverings—Plastic
Carpenter & Co., Inc. B3/Ca
Columbus Coated Fabrics Corp. A31

Wall Tile (see Tile—Wall)

Walls—Glass Block
Kimble Glass Co., Owens-Illinois A20, 21
Pittsburgh Corning Corp. A19; A22

Walls—Movable (see Partitions—Folding, Movable)

Wardrobe Hardware
Fairhurst Co., Inc., John T. B30, 31
Glynn-Johnson Corporation B9/Gl
Nelson Co., Inc., A. R. B51
Richards-Wilcox Mfg. Co. B52, 53
Stanley Works B55
Vogel-Peterson Company D3/Vo
Yale & Towne Mfg. Company B9/Ya

Wardrobe Racks
Desco Corp. G3/De
Nelson Co., Inc. A. R. B51
Richards-Wilcox Mfg. Co. B52, 53
Vogel-Peterson Company D3/Vo

Wardrobes
All-Steel Equipment Inc. D51
Anderson-Hickey Company D31
Desco Corp. G3/De
Educators Manufacturing Co. D3/Ed
Fairhurst Co., Inc., John T. B30, 31
General Fireproofing Company ... D5/Ge
Horn Div., Brunswick-Balke-Collender Co. B5/Ho
Interior Steel Equipment Co. .. F55; B50
Kewaunee Manufacturing Co. F2/Ke
Lyon Metal Products, Inc. F56, 57
Medart Products, Inc. F58, 59
Mutschler Brothers Company E3/Mu
Nelson Company, Inc., A. R. B51
Richards-Wilcox Mfg. Co. B52, 53
School Interiors Co., Inc. D48
Star Steel Equipment Co., Inc. F61
Vogel-Peterson Company D3/Vo
Wood-Metal Industries, Inc. E3/Wo

Washers—Clothes
General Electric Company E3/GE

Washroom Equipment & Supplies
Crane Co. C34, 35
Electric-Aire Engineering Corp. C39
Hillyard Chemical Company H14, 15
Huntington Laboratories, Inc. H1/Hu; H21

Waste Disposers
General Electric Company E3/GE
Morse Boulger Destructor Co. C31

Waste Receptacles
Bennett Manufacturing Co. G5/Be
General Fireproofing Company ... D5/Ge
National Vulcanized Fibre Co. H22
United Metal Cabinet Corp. G32

Water Closet Cleaners
Huntington Laboratories, Inc. H1/Hu; H21

Water Closets
Crane Co. C34, 35

Water Cooler-Refrigerator Combination
Cordley & Hayes C33

Water Coolers & Fountains
Century Brass Works, Inc. C32
Cordley & Hayes C33
Crane Co. C34, 35
Taylor Co., Halsey W. C38

Water Heaters
Farrar & Trefts, Inc. C13
Orr & Sembower, Inc. C24

Waterproofing
Empire Varnish Company H9
Horn Corporation, A. C. A8/Ho
Standard Dry Wall Products A8/St
Western Waterproofing Co., Inc. A34

Water Purification
Olin Mathieson Chemical Corporation G26
Wallace & Tiernan G27

Water Sport Devices
American Playground Device Co. G28, 29
General Playground Equipment Inc. .. G30
Hussey Mfg. Co. G9
Recreation Equipment Corp. G31

Wattmeters (see Meters)

Waxes—Anti-Slip Ingredients
Legge Company, Inc. H18
Multi-Clean Products, Inc. H20

Waxes—Floor
Continental Car-Na-Var Corp. H8
Fuller Brush Company H10
Hillyard Chemical Company ... H14, 15
Huntington Laboratories, Inc. H1/Hu; H21
Legge Company, Inc. H18
Multi-Clean Products, Inc. H20

Waxing Machines—Electric
Advance Floor Machine H5
American Floor Surfacing Machine Co. H6
Clarke Sanding Machine Company .. H7
Continental Car-Na-Var Corp. H8
General Floorcraft, Inc. H11
Hild Floor Machine Company .. H12, 13
Holt Manufacturing Company H16
Huntington Laboratories, Inc. H1/Hu; H21
Kent Company, Inc. H17
Lincoln-Schlueter Floor Machinery Co. H19
Multi-Clean Products, Inc. H20
United Floor Machine Company, Inc. H24

Weatherproofing
Horn Corporation, A. C. A8/Ho
Standard Dry Wall Products A8/St
Western Waterproofing Co., Inc. A34

Weather Strips
Accurate Metal Weather Strip Co., Inc. A33

Winches
Thompson Electric Company C49

Window Blinds (see Venetian Blinds)

Window Curtains & Draperies (see Curtains & Draperies)

Window Darkening Shades & Blinds
Columbus Coated Fabrics Corp. A31
Forse Manufacturing Company A32
Joanna Western Mills Company .. A5/Jo
Kirsch Company A6/Ki
Levolor Lorentzen, Inc. A6/Le
Rowles Co. B42

Window Guards—Iron & Wire Mesh
Kinnear Manufacturing Co. B45
Stewart Iron Works Co., Inc. H30

Window Hardware
Adams & Westlake Company A4/Ad
Bayley Co., William A24, 25
Flynn Mfg. Co., Michael A26, 27
Marmet Corporation A4/Ma
Truscon Steel Div., Republic Steel A28, 29

Window Sash (see Sash—Window)

Window Shades (see Shades—Window)

Window Sills (see Sills—Door & Window)

Window Trim (see Trim for Doors, Windows, Corners, etc.)

Window Walls—Prefabricated
Adams & Westlake Company A4/Ad
Bayley Co., William A24, 25
Flynn Mfg. Co., Michael A26, 27
Marmet Corporation A4/Ma
Truscon Steel Div., Republic Steel A28, 29

Windows—Aluminum (see Aluminum Windows)

Windows—Awning & Projected Type

Adams & Westlake Company A4/Ad
Aluminum Window Manufacturers Assn. A4/Al
Bayley Co., William A24, 25
Cupples Products Corporation A4/Cu
Flynn Mfg. Co., Michael A26, 27
General Bronze Corporation A4/Ge
Marmet Corporation A4/Ma
Truscon Steel Div., Republic Steel A28, 29
Tru-Seal Window Division, Industrial Machine Tool Co., Inc. A23
Windalume Corporation A30

Windows—Double Hung

Adams & Westlake Company A4/Ad
Aluminum Window Manufacturers Assn. A4/Al
Bayley & Co., William A24, 25
Cupples Products Corporation A4/Cu
General Bronze Corporation A4/Ge
Marmet Corporation A4/Ma
Truscon Steel Div., Republic Steel A28, 29
Windalume Corporation A30

Windows—Glass Block for

Kimble Glass Co., Owens-Illinois A20, 21
Marmet Corporation A4/Ma
Pittsburgh Corning Corp. A19; A22

Windows—Intermediate Casement

Aluminum Window Manufacturers Assn. A4/Al
Marmet Corporation A4/Ma
Truscon Steel Div., Republic Steel A28, 29

Windows—Metal-Framed

Adams & Westlake Company A4/Ad
Aluminum Window Manufacturers Assn. A4/Al
Bayley Co., William A24, 25
Cupples Products Corporation A4/Cu
Flynn Mfg. Co., Michael A26, 27
General Bronze Corporation A4/Ge
Marmet Corporation A4/Ma
Truscon Steel Div., Republic Steel A28, 29
Tru-Seal Window Division, Industrial Machine Tool Co., Inc. A23
Windalume Corporation A30

Windows—Storm (see Storm Windows)

Wire—Barbed

Anchor Post Products, Inc. H25
Colorado Fuel & Iron Corp., Wickwire Spencer Steel Div. H26
Continental Steel Corporation H27
Cyclone Fence Dept., United States Steel Corporation H28
Stewart Iron Works Co., Inc. H30

Wire Enclosures

Anchor Post Products, Inc. H25
Colorado Fuel & Iron Corp., Wickwire Spencer Steel Div. H26
Continental Steel Corporation H27
Cyclone Fence Dept., United States Steel Corporation H28
Stewart Iron Works Co., Inc. H30

Wire Fabric—Welded

Laclede Steel Company A12
Truscon Steel Div., Republic Steel A28, 29

Wire Gymnasium Baskets (see Baskets—Wire)

Wires & Wiring Installations

Federal Pacific Electric Co. F16
Graybar Electric Company C51

Wood Flooring

Jennison-Wright Corporation B1/Je

Woodworking Machinery & Tools

Atlas Press Company F34, 35
Boice-Crane Company F36
Duro Metal Products Company F41
Greenlee Tool Co. F29
Logan Engineering Company F45
Millers Falls Company F31
Oliver Machinery Company F47
Powermatic Machine Co. F48
Stanley Tools F32
Walker-Turner Div., Kearney & Trecker Corp. F50, 51

Work Benches

Educators Manufacturing Co. D3/Ed
Interior Steel Equipment Co. F55
Kewaunee Manufacturing Co. F2/Ke
Laboratory Furniture Co., Inc. .. F22, 23
Lyon Metal Products, Inc. F56, 57
Metalab Equipment Corp. F2/Me
Mutschler Brothers Company E3/Mu
Standard Pressed Steel Co. F28
Stacor Equipment Co. F3/St
Tolerton Company F3/To

DISTRIBUTORS
OF EDUCATIONAL EQUIPMENT AND SUPPLIES



Listings of distributors in this Directory are grouped alphabetically by regions as shown on the map above.

The following four types of firms who serve school buyers are included:

1. **School Supply Distributors.** These maintain local stocks of equipment and supplies. Many are members of National School Service Institute, identified here by exponent numeral[1].

2. **Distributors of audio-visual products.** Among these, the members of National Audio Visual Association are identifiable by exponent numeral[2].

3. **Laboratory Supply Firms,** who specialize in science equipment and apparatus. Most maintain stocks of the lines they handle. All are indicated by numeral[3].

4. **Manufacturers' Agents.** These firms are usually equipped to help in planning and installing the equipment they handle, but do not ordinarily stock it.

Region 1—New England States

Robert A. Bennett[4], Hurricane Road, Keene, New Hampshire
Brunswick School Furniture
Erickson Fold-A-Way Tables, Stages and Choral Risers
Krueger Folding Chairs and Trucks
ASE (All Steel Equipment) Lockers, Desks, Files
Complete Furnishings, Equipment and Supply Line

Bailey Film Service[2], 59 Chandler St., Worcester, Mass.
Audio-Visual Service and Supplies

Milton Bradley Co.[1], **New England Division**, 43 Cross Street, Springfield 2, Mass.
Milton Bradley Art and Education Materials
Milton Bradley Furniture
American Playground Device Equipment
Complete School Supply and Equipment

Cambosco Scientific Co.[3], 37 Antwerp Street, Boston, Mass.

Cascade Paper & School Supplies, Inc.[1], 1 Brown Street, North Adams, Mass.

Cinema, Inc.[2], 234 Clarendon St., Boston 16, Mass.

The Claflin Co.[3], 40 Mathewson St., Providence 3, R. I.

Doe & Ingalls, Inc.[3], Vine & Garden Sts., Boston, Mass.

Eastern Scientific Co.[3], 51 Bassett St., Providence, R. I.

Equipment Sales Co., Inc., 3013 Dixwell Ave., Hamden, Conn.

Nat Faunce Audio-Visual Service[2], 210 Waterman Avenue, East Providence, R. I.

Fileg & Newbury[2], 41-45 Water St., Torrington, Conn.

Fisher Scientific Co.[3], 635 Greenwich St., N. Y. 14, N. Y.

Gilbert & Kelley, Inc., 134 Middlesex St., Lowell, Mass.

Gledhill Bros., Inc.[1], 20 Chestnut Avenue, Jamaica Plain, Boston 30, Mass.

J. L. Hammett Co.[1], Kendall Square, Cambridge 42, Mass.
American Seating Company, School Furniture
Binney & Smith Company, Crayola and Art Materials
Harbutt's Plasticine
Kindergarten Material and Furniture
Wayne Iron Works, Grandstands
Weber Costello Company, Hyloplate, Sterling and Litesite Chalkboards
School Supplies
Blackboards
Paper
Bulletin Boards
Composition and Examination Books
Hand Looms for weaving and occupational therapy materials
Diplomas and Testimonials
Pencils—Eagle and Dixon
Maps and Globes

Headlight Film Service[2], 111 Ocean St., South Portland, Me.

Howe & French, Inc.[3], 99 Broad Street, Boston 10, Mass.
Laboratory equipment and supplies
Microscopes-optical instruments
Pyrex and Kimble glassware
Beckman instruments—Analytical Balances
Reagent Chemicals—J. T. Baker—Merck and Company

Inter Church Audio-Visuals, Inc.[2], 15 May St., Hartford, Conn.

Jackson Chairs, Inc., 285 Columbus Avenue, Boston 16, Mass.
Howe Folding Furniture, Inc.—folding tables
Shwayder Bros.—Samsonite Folding Chairs
Vogel Peterson Co.—coat racks, checkroom equipment
Samsonite School Furniture
Platforms, band and choral stands

Jarrell-Ash Co.[3], 26 Farwell St., Newtonville 60, Mass.
Spectrographs and accessories
Micro Spectrophotometer
Interferometers
Refractometers
Microphotometers, Recording and Non Recording
Monochromators

Ladd Visual Service[2], 235 Stuart Street, Boston 8, Mass.

Macalaster Bicknell Co. of Conn.[3], 181 Henry St., New Haven 11, Conn.

Macalaster Bicknell Co.[3], 243 Broadway, Cambridge 39, Mass.

E. F. Mahady Co.[3], 851 Bolyston St., Boston 16, Mass.
General Laboratory Supplies
Microscopes
Kimble and Pyrex Glassware
Merck Chemicals
Hamilton Science Class Room Furniture and Equipment

Mainco Trading Co.[1], P. O. Box 88, Canton, Mass.

Major Theatre Equipment Corp.[2], 44 Winchester St., Boston, Mass.

Massachusetts Motion Picture Service, Inc.[2], 35 Market St., Lynn, Mass.

McAuliffe Paper Co., Inc., Burlington, Vt.
American Playground Device Co.
Arlington Seating Co.
The Hale Co. (wood desk units)
Horn Folding Gym Seating and Partitions
Luther O. Draper Shade Co.
Mitchell Manufacturing Co. (Folding Tables, Stages, etc.)
The Tolerton Co. (Industrial Equipment)
Westmoreland Seating Co.

Movocco Film[2], 14 Leonard St., Springfield 4, Mass.

New England Film Service, Inc.[2], 39 Fairview Ave., Arlington 74, Mass.
Bell and Howell Special Representative
American Optical Co. Products-Eyegate Filmstrips
DuKane Corp. Sales and Service
Keystone View Co. Tachistoscope and Overhead Projection
Complete Projector Repair Service

The Office Appliance Co., 18 Custom House St., Providence, R. I.

The Papercrafters, Inc., 724 Main St., Holyoke, Mass.

Herbert G. Parker Co.[2], Ocean House Road, Cape Elizabeth, Maine

G. H. Payne Motion Picture Service[2], United Theatre Bldg., Westerly, R. I.

Peakes Laboratory Supply Co., Inc[3], 22 Lexington St., Rear, Waltham 54, Mass.

Pix Film Service[2], 34 E. Putnam Ave., Greenwich, Conn.
Branch: 1205 Main St., East Hartford, Conn.

A. H. (Jack) Rice Co., Inc.[2], 78 West Central St., Manchester, New Hampshire

Rice Film Co.[2], 123 Pleasant St., Manchester, New Hampshire

Rockwell Film and Projection Service[2], 182 High St., Hartford, Conn.

Avard J. Sloat[2], 640 Greenville Ave., Providence 11, R. I.

Smith Photographic Store[2], 219-221 Massachusetts Ave., Boston, Mass.
American Optical
Bell & Howell Specialist
Chas. Beseler Co.
Eastman Kodak Audio Visual
RCA Audio Visual
Soundview Film Strip

South End Film Library[2], 56 Vallonia Terrace, Fall River, Mass.

Stanley-Winthrop's Inc.[2], 90 Washington Avenue, Quincy 69, Mass.
Ampro-Sound Projectors
Audio-Master-Record Players
Radiant-Screens
United Nation's—Films
Young America—Film and Filmstrips
Films of the Nations—Films

United Camera Exchange, Inc.[2], 607 Westminster St., Providence 3, R. I.

Valley Cinema, Inc.[2], 958 State St., Springfield 9, Mass.
Audio-Visual specialists; sales and service
Distributor of RCA Sound Products

Visual Education Service, Inc.[2], 116 Newbury St., Boston 16, Mass.

Westcott, Slade and Balcom Co.[2], 95 Empire St., Providence 3, R. I.

Wholesale Film Center, Inc.[2], 20 Melrose St., Boston 16, Mass.

Henry S. Watkins Co.[1], 716 Columbus Avenue, Boston 20, Mass.

Region 2—New York, New Jersey and Ontario, Canada

Ace Scientific & Industrial Co.[3], 810 Broadway, New York 3, N. Y.

Allied Equipment Corp., 10 Chambers St., Trenton, N. J.
Irwin Seating Company—School Desks
Williams & Brower, Inc.—Wood Tables & Chairs
Jasper Desk Company—Office Desks
Jasper Chair Company—Office Chairs
Durham Mfg. Co.—Folding Chairs

American Seating Co.[1], 923 W. Genesee St., Syracuse 4, N. Y.

Association Films, Inc.[2], 347 Madison Ave., N. Y. 17, N. Y.

Association Films[2], Broad & Elm St., Ridgefield, N. J.

Atkins & Company, Inc., 326 Broad St., Summit, N. J.
Emco School Wardrobes
Chalkboard (all types) including United States Armorply, Aluminum Trim & Corkboard
Erickson Fold-A-Way Tables, Choral Risers & Stages
Bleachers (LEAVITT) Indoor and Outdoor
Basketball Backstops and Playground Equipment
Cafeteria, Auditorium and Stadium Seating
Mackin Visual Education Blinds
Loxit Floor and Acoustical System

Audio Film Center[2], 10 Fiske Place, Mount Vernon, N. Y.

Bacon & Vincent Co.[1, 2], 1 Ellicott St., Buffalo 3, N. Y.; 1501 Franklin Ave., Mineola, N. Y.

Audio Visual Aids Department
Beseler Opaque and transparency projectors
Cram maps, charts and globes
Curriculum filmstrips
Encyclopedia Britannica filmstrips
Jam Handy instructional filmstrips
Radiant projection screens and shadow boxes
S.V.E. projectors, filmstrips and slides
Furniture & Contract Department
Arlington Seating Co. furniture
Bavinco home economics equipment
Burke playground and athletic equipment
Draper window shades
Gunlocke classroom seating furniture
Moduwall—for classrooms
Norcor classroom seating
Universal Gym stands & bleachers
Supplies Department
Chalk and cork boards and supplies
Ditto duplicating machines, paper and supplies
NuMedia Brush, Finger & Screen paint
School Supplies and papers of all kinds

Bardeen's Inc.[1], 543 East Genesee St., Syracuse 2, N. Y.
Art and handicraft products
Class registers and school forms
Kindergarten supplies and equipment
Playground and athletic equipment
School supplies and school furniture

E. J. Barnes and Co., Inc.[3], 30 Rockefeller Plaza, N. Y. 20, N. Y.

J. & H. Berge[3], 145 Hudson St., New York 13, N. Y.

Biological Supply Co.[3], 1176 Mt. Hope Avenue, Rochester 7, N. Y.

Howard W. Boise, Inc.[2], 144 E. Front St., Plainfield, N. J.

Brandon Films, Inc.[2], 200 W. 57th Street, New York 19, N. Y.

Walter A. Braun Co., 249 High Street, Newark 2, N. J.

Buchan Pictures[2], 122 W. Chippewa St., Buffalo, N. Y.

Buffalo Apparatus Corp.[3], 82-90 Chenango St., Buffalo, N. Y.

Business Furniture, Inc.[1], 542 North Avenue, Elizabeth, N. J.
Griggs Equipment Co.—School furniture—auditorium seating
Virco Mfg. Co.—School furniture—folding chairs
Mahoney Sales Co.—School furniture
Midwest Folding Products—Folding Tables
Jasper Table Co., School and office tables

Carey Audio-Visual Co.[2], 12 Providence Place, Albany, N. Y.

Central Scientific Co. of Canada, Hendry Div.[1], 146 Kendal Ave., Toronto 4, Ontario, Canada

Council Films, Inc.[2], 50 N. Main St., Homer, N. Y.

Crawford, Immig and Landis, Inc.[2], 265 West 14th St., N. Y. 11, N. Y.

James E. Duncan, Inc.[3], 139 N. Union St., Rochester 5, N. Y.

Educators Supplies Limited[1], 95 Dundas St., London, Ontario, Canada

Herbert L. Farkas Co.[1], 892 Broad St., Newark 2, N. J.
Furniture & Equipment for complete School Installations
W. H. Gunlocke Chair Co.—School & Office Furniture
Irwin Seating Co.—School and Auditorium Seating
Maple Wood Products Co.—School Furniture
Hoosier Desk Co.—Office Desks and Tables
All Steel Equipment Co.—Steel Desks, Files, Cabinets & Lockers
Berger Mfg. Co.—Steel Shelving Lockers
Educators Mfg. Co.—Classroom Cabinets

The Filmstrip House[2], 15 West 46th St., N. Y. 36, N. Y.

Earl A. Fisher, 71 Thompkins Ave., Mamaraneck, N. Y.

Fisher Studio, Inc.[2], 803 Lincoln Place, Brooklyn 16, N. Y.

General Laboratory Supply Co.[3], Box 2607, Paterson, N.J.
Pyrex and Kimble Glass, Coors Porcelain
Instruments, Glass Blowing, Chemicals

Charles J. Giegerich[2], 42-20 Kissena Ave., Flushing, L. I. 55, N. Y.

The Emil Greiner Co.[3], 20-26 N. Moore St., N. Y. 13, N. Y.

Otto R. Greiner Co.[3], 221 High Street, Newark 2, N. J.

Hallenbeck & Riley[2], 562 Broadway, Albany 7, N. Y.

J. L. Hammett Co.[1], 380 Jelliff Ave., Newark 7, N. J.
School Papers, Examination Books
Arts & Crafts material, Kindergarten supplies
Looms and Weaving supplies
Bulletin Boards, Blackboards, etc.
Harbutt's Plasticine

Institutional Cinema Service, Inc.[2], 1560 Broadway, N. Y. 19, N. Y.
Rental of 16mm entertainment films
Visual aids service, specializing in educational films
Film equipment, accessories, sound systems

L. Kaltman & Sons, Inc.[2], 287 Washington St., Newark 2, N. J.

Long Island Surgical Supply Co.[3], 87-82 Merrick Blvd., Jamaica 3, L. I., N. Y.

E. Machlett & Son[3], 220 East 23rd St., New York 10, N. Y.

Marks & Fuller, Inc., 332 E. Main St., Rochester 4, N. Y.

The Maurer Company, Inc., 31 Richmond St., Rochester 7, N. Y.
Kewaunee Laboratory Furniture
Berger Steel Lockers & Shelving
Horn Folding Partitions, Bleachers, Wardrobes and Stages
Rol-Fol Folding Tables
Adjusto Stools, Chairs and Typing Tables
Grade-Aid Div., Colonial Engineering Co., Inc.

J. S. McHugh Co., Inc., 839 Stewart Ave., Garden City, N. Y.
E. H. Sheldon Equipment Co.—Laboratory, Homemaking Art, Shop
Virco Mfg. Corp.—Classroom Seating
Erickson Fold-A-Way Products—Tables, Choral Risers
Republic Steel—Lockers, Shelving, Storage Cabinets
Narragansett Gym Equipment Co.—Backstop & Equipment for Gym
Complete Line of School Furniture & Equipment

Meyer Scientific Supply Co., Inc.[3], 1672 62nd St., Brooklyn 4, N. Y.
Distributors for Corning Glass Works
Kimble Glass Co., Mallinckvod Chemical Works
All other pertinent manufacturers of Laboratory Supplies
Also manufacturers and distributors of Royalton Laboratory Products

H. B. Miles, Experimental Laboratory[2], 17 Lenox Pl., Middletown, N. Y.

Modern Talking Picture Service[2], 45 Rockefeller Plaza, New York, N. Y.

Motion Picture Projection Service[2], 4590-A Kings Highway, Brooklyn 34, N. Y.

Movies U. S. A., Inc.[2], 729 Seventh Avenue, New York 19, N. Y.

Meyer School Supplies, Ltd.[1], 20 Densley Ave., Toronto 15, Ontario, Canada

N. J. Laboratory Supply Co.[3], **Div. of Central Scientific Co.**, 441 Clinton Ave., Newark 8, N. J.

N. Y. Laboratory Supply Co., Inc.[3], 76-78 Varick St., N. Y. 13, N. Y.

N. Y. Scientific Supply Co.[3], 28 West 30th St., New York 1, N. Y.

Nu-Art Films, Inc.[2], 112 W. 48th St., New York 36, N. Y.

Palo Laboratory Supplies, Inc.[3], 81 Reade St., N. Y. 7, N. Y.

Para Laboratory Supply Co.[3], 221 N. Hermitage Ave., Trenton 8, N. J.
Glassware All Types—including Special Fabrication
Analytical Balances—Instrument Repairs
Chemicals: Reagent—Fine Organic-Biochemicals
Microscopes & Photoelectric Instruments
General Laboratory Supplies

Peckham, Little & Co., 243 W. 17th St., N. Y., N. Y.

Pix Film Service[2], 25 Lee Avenue, White Plains, N. Y.

Renner Motion Picture Service[2], 539 Genesee St., Buffalo 4, N. Y.
Complete Audio-Visual Sales & Service

Riverside Chemical Co., Inc.[3], 871-947 River Road, N. Tonawanda, N. Y.

Severance Photo, Inc.[2], 46 Public Square, Watertown, N. Y.

Scientific Glass Apparatus Co., Inc.[3], 100 Lakewood Terrace, Bloomfield, N. J.
General Laboratory Supplies
Laboratory Instruments & Equipment
Laboratory Furniture
Chemicals—all types
"Pyrex" and Kimble Glassware
Glassblowing Facilities

Ray S. Snyder Co., 9 East 45th St., N. Y. 17, N. Y.
Fred Medart Products, Gymnasium Apparatus, Scoreboards, Telescopic Gym Seats, Basketball Backstops
Mutschler Hardwood Cabinetry for Food and Clothing Homemaking Depts.
Sani-Dri Electric Hand-Hair Dryers
Sico Rolling Folding Combination Table and Bench Units
Wood and Steel Bleachers and Grandstands

Sonocraft Corporation, 115 West 45th St., N. Y., N. Y.
Recording and Sound Equipment
Tape, Disc Recorders
Phonographs and PA Systems

Sound & Visual Products[2], 17 New York Avenue, Westbury, N. Y.
RCA Visual Products Distributors
Motion Pictures, Opaque Filmstrip and Slide Projection equipment, materials and supplies
Magnetic and Disc recording—play back equipment
Screens, Stands, Storage, Training aids, Intercom systems

Standard Scientific Supply Corp.[3], 34-38 W. 4th St., N. Y., N. Y.

Otto Ulbrich Co., Inc., 386 Main St., Buffalo, N. Y.

U. S. Scientific Supply Co.[3], 1394 Flatbush Avenue, Brooklyn, N. Y.
Producers of Reagents, Stains and USSLA Products.
General Laboratory Supplies
Merck Chemicals; All Laboratory Glassware
Metal Laboratory Supplies

U. S. Seating Co., 570 7th Ave., New York 18, N. Y. and: 108 North State St., Chicago 2, Ill.
Folding Chairs, Wood
Folding Chairs, Steel
Folding Leg Tables
School Desks
Tablet Arm Chairs
Bleachers, Portable, Wood and Steel
Grandstands—Stadiums
Cafeteria Chairs and Tables
Dormitory Furniture
Portable Basketball Floors
Portable Chair Stands and Stages

Visual Aid Service[2], 12 Indiana St., Hicksville, N. Y.

Visual Aids, Inc.[2], 474 Bloomfield, Montclair, N. J.

Webster Paper & Supply Co., Inc.[1], Central Warehouse Bldg., Albany 4, N. Y.
American Crayon Co. "Old Faithful" art items
Binney & Smith Co., "Gold Metal" art materials
Complete line of school and art materials
Playground items and furniture

Wilber Visual Service[2], 28 Genesee St., New Berlin, N. Y. Eastern Office: 119 E. State St., Albany, N. Y.

Will-Buffalo, Inc.[3], 82 Chenango St., Buffalo 5, N. Y.
Laboratory Instruments, Apparatus and Chemicals

Will Corporation[3], 39-51 Russell St., Rochester, N. Y.
Laboratory Instruments, Apparatus and Chemicals

Will-New York, Inc.[3], 594 Broadway, New York, N. Y.
Laboratory Instruments, Apparatus and Chemicals

Art Zeiller Co., Inc.[2], 26 Hudson St., Ridgewood, N. J.

Region 3—Pennsylvania, Delaware, Maryland, West Virginia

Ace Audio-Visual Supply[2], 1319 Derry St., Harrisburg, Pa.

American Seating Co., of Pa.[1], 16th St. at Hamilton, Philadelphia, Pa.
All types of Public Seating
School supplies and Equipment
Complete Furniture & Furnishing for Dormitories and Lounges
Library Furniture
Peterson Laboratory Equipment
Playground and Gym Equipment
Mutschler's Homemaking Equipment
Rol-Fol Tables, Inc.
Universal Bleachers and Grandstands
Chalkboards and Window Shades
Indiana Teachers and Office Desks

Harry R. Anthonsen, 67 Long Lane, Upper Darby, Pa.
Browne-Morse Desks, Files and Chairs
Browne-Morse Laboratory Furniture
Deluxe Metal Storage and Library Shelving
Soundex Partitions & Movable Walls
Manual Arts Equipment & Steel Lockers
Krueger Folding Chairs

Milton Bradley Co.[1], 3304 Arch St., Philadelphia 4, Pa.
Milton Bradley Art and Education Materials
Milton Bradley Furniture
American Playground Device Equipment
Complete School Supply and Equipment Line

Burrell Technical Supply Co.[3], 1936 5th Avenue, Pittsburgh 19, Pa.

Crichton Engineering Co.[1], P. O. Box 1946, Charleston 27, W. Va.

District Equipment Co., Inc., 5122 Baltimore Ave., Hyattsville, Maryland

Edward P. Dolbey & Co.[3], 3613 Woodland Avenue, Philadelpiha, Pa.

C. M. Eichenlaub Co.[1], 914 Architects Bldg., Philadelphia, Pa. And: 601 Empire Bldg., Pittsburgh 22, Pa.
Peabody Classroom and Auditorium Seating
Sjostrom "Uniflex" Laboratory Furniture
Wayne Gymstands and Grandstands
Sjostrom "New Life" Library Furniture
Brewer-Titchener "Hostess" Steel Folding Chairs and Tables
Allen Student Desks and Chairs
J. E. Porter Gymnasium Equipment
Manitowoc Church and Chapel Furniture
Fleetwood Classroom Furniture

Engineered Materials Co., #1 Cedar Blvd., Pittsburgh 28, Pa.
"Armorply" Porcelain-on-steel Chalkboards
Framed Slate and Composition Chalkboards
Mackin Visual Education Blinds
Classroom Wardrobes
Extruded Aluminum Chalkboard Trim

Fisher Scientific Co.[3], 717 Forbes St., Pittsburgh 19, Pa.
Pittsburgh, New York, Washington, St. Louis, Chicago, Montreal, Toronto.
America's Largest Manufacturer-Distributor of Laboratory Supplies, instruments, apparatus, furniture and reagent chemicals.

Folkemer Photo Service[2], 927 Poplar Grove St., Baltimore 16, Md.

J. E. Foss Co.[3], 2422 Saw Mill Run Blvd., Pittsburgh, Pa.

Garrett-Buchanan Co.[1], 12-20 So. 6th St., Philadelphia 6, Pa.

The Henry B. Gilpin Co.[3], 302 West Lombard St., Baltimore, Md.

Grise Film Library[2], 105 E. 9th St., Erie 1, Pa.

Haley Audio-Visual Service[2], P. O. Box 703, Charleston 23, W. Va.

Harshaw Scientific Div. of Harshaw Chemical Co.[3], Jackson & Swanson Sts., Philadelphia 48, Pa.
Laboratory Instruments, Apparatus and Chemicals

Hartman-Leddon Co.[3], 5821 Market St., Philadelphia 39, Pa.

L. B. Herr & Son[1], 46 King St., Lancaster, Pa.
General Supplies, Arts & Crafts
Brunswick School Furniture

Heyl Physicians Supply Co.[3], 22 W. 9th St., Erie, Pa.

William G. Hintz, Inc.[1], 838 Penn St., Reading, Pa.
Complete School and Art Supplies
School Furniture
Samson Metal Folding Chairs and Tables
Steel Lockers and Filing Supplies
Ditto Machines and Supplies

Hobby Horse Visual Aid Service[2], 4 Race St., Cambridge, Maryland
Draper Dratex Cloth Window & Darkening Shades
Premier Studio Stage Curtains, Drapes & Equipment
Ampro Audio-Visual Dealer, 16mm projectors, tape recorders

Hollywood Film Service[2], 841 Penn St., Reading, Pa.
Ampro Kodascope and other Sound Projectors
Ampro Revere and Webcor Tape Recorders
American Optical Equipment
Audio-Visual & Photographic Supplies
16mm Rental Library,—Educational and Religious

The James & Law Co., 217 West Main St., Clarkesburg, W. Va.

William G. Johnston Co.[1], 1130 Ridge Ave., Pittsburgh 12, Pa.
American Desk Mfg. Company
Art & Handicraft Materials
Berger Steel furniture and lockers
Everwear playground equipment
General school supplies
Kindergarten supplies and furniture
Laboratory and Homemaking equipment

Estate of Harry A. Keene[1], Pottstown, Pa.
General School Supplies
General Art Supplies

Kemmerer Paper Co.[1], **Division of Garrett-Buchanan Co.,** 2030 Vultee St., Allentown, Pa.

Kruger Motion Picture Service[2], 3145 No. Broad St., Philadelphia 32, Pa.

Kurtz Bros.[1, 2], 4th & Reed, Clearfield, Pa.
Branch: 8033 Bennett St., Pittsburgh 21, Pa.
Audio-Visual equipment supplies
Class, plan books and school annual publishers
Ditto machines, Suppliers, Papers
Kindergarten and playground apparatus
School Supply and Equipment lines, complete

Kyle & Co.[1, 2], Court St. & Washington Ave., Clarksburg, W. Va.

J. S. Latta, Inc.[1],1458 Fourth Avenue, Huntington 1, W. Va.

James Lett Co.[2], 225 No. 2nd St., Harrisburg, Pa.

Lewy Studios[2], 853 North Eutaw St., Baltimore 1, Md.

J. P. Lilley & Son[2], 928 N. Third St., Harrisburg, Pa.
Distributor—Victor and RCA Sound Projectors
Audio-Visual Supplies and Equipment

Lippincott Pictures, Inc.[2], 4729 Ludlow St., Philadelphia 39, Pa.

Metal Fixture Company, Dartmore and Englert Sts., Pittsburgh 10, Pa.
Clarin Manufacturing Co.—Folding Chairs
Dudley Lock Corporation—Combination Padlocks
Vogel Peterson Co.—Hat and Coat Racks, Checkroom Equipment
Charles W. Rice Co.—Window Shades and Draperies
Mitchell Manufacturing Co.—Folding Tables
Band and Choral Stands
P. O. Moore, Inc.—TelKee Moore Key Control Systems

John P. Morgan Co., Inc., 317 North 13th St., Philadelphia, Pa.

Pavis, Inc., P. O. Box 6095, Charleston, W. Va.

Playco Sales Company, Box 388, Mars, Penna.
Playtime Bleachers
Playtime Perm-A-Stand
Playtime Portable Risers
Fred Medart Products, Inc. (Gymnasium Equipment)
Fred Medart Products, Inc. Gym Seats, Basketball Backstops
Erickson Fold-A-Way Tables, Banquet Tables
National School Furniture
Acme Coiling Partitions (Gymnasiums and general purpose rooms)

Preble Company Inc., 835 S. 13th St., Harrisburg, Pa.
Brunswick Folding Partitions & Bleachers
Brunswick Folding Wardrobes and Stages
Gotham Chalk and Cork Boards
Gotham Display Cases
Bronze & Aluminum Plaques

B. Preiser Company, Inc.[3], 416 W. Washington St., Charleston, W. Va.

Reynolds-Shaffer Corp., 3122 Jenkins Arcade, Pittsburgh 22, Pa.
Wilkinson—Linen—Rubbish—Dust Chutes

Roberts & Meck, Inc.[1], 18th & Bellevue Sts., Harrisburg, Pa.

The Scientific Equipment Co.[3], 3527 Lancaster Avenue, Philadelphia 4, Pa.

Elmer A. Simpson[2], 818 Virginia St., West, Charleston 2, W. Va.
Audio Visual

Stark Films[2], 537 N. Howard St., Baltimore 1, Md.

Arthur H. Thomas Co.[3], P. O. Box 779, West Washington Square, Philadelphia 5, Pa.
Apparatus and Reagents for Laboratories of Chemistry and Biology—1472 pg. Catalog
22,500 items in stock for immediate shipment

Harry A. Trumpfheller, Factory Representative, 640 Hazelhurst Ave., Merion, Pa.
Arlington Seating Co.—Student's desks and chairs
Northern Maple—Student's wood desks and chairs
Durham Mfg. Co.—folding chairs
Formica Top tables
Folding tables

L. C. Vath, Audio Visual Aids[2], P. O. Box "C", Sharpesville, Pa.

James T. Vernay & Sons, Co.[1], 5 East Lexington St., Baltimore 2, Md.

R. A. Wagner Co., Quakertown, Pa.
Philadelphia office: 1011 Chestnut St.

Welsh Studios[2], 1209-11 E. Chelton Ave., Philadelphia 38, Pa.

West Virginia Seating Co.[1], Huntington 9, W. Va.

Will Corporation of Maryland[3], 5-31 North Haven St., Baltimore 24, Md.
Laboratory Instruments, Apparatus and Chemicals

Williams, Brown & Earle, Inc.[2, 3], 904-06 Chestnut St., Philadelphia 7, Pa.

Clem Williams Films[2], 623 Wylie Avenue, Pittsburgh 19, Pa.

Region 4—Illinois, Michigan, Indiana, Ohio, Kentucky

Academy Film Service, Inc.[2], 2110 Payne Ave., Cleveland 14, Ohio
Ampro—Bell & Howell—Revere Cameras
8mm & 16mm Projectors, Tape Recorders
Film Equipment Rentals—Beseler Products

Ace Chemical Co.[3], 216 Elm St., Cincinnati 2, Ohio

Acme School Supply, 2nd & Race Sts., Cincinnati, Ohio

Allied Inc.[1], 325 N. Illinois St., Indianapolis 7, Ind.

Allied Scientific Co.[3], 555 S. First St., Louisville 2, Ky.

Alpha Cine Service, Inc.[2], 125 E. Sixth St., Cincinnati 2, Ohio

American Film Registry[2], 24 E. Eighth St., Chicago 5, Ill.

Audio Film Center[2], 2209 E. 75th St., Chicago 49, Ill.

The Backus Bros. Co., 225 E. Third St., Cincinnati, Ohio
Furniture Contractors and Cons.
Institutional Furniture Made to Order
Formica Furniture & Fixtures
Heywood Wakefield School Furniture
Lounge, Library & Classroom Specialists
Dormitory Furniture & Bedding
Samsonite and other folding tables—chairs

Everett M. Bailey[1], 306 Indiana Ave., Pontiac, Ill.

Bartha Visual Educational Service[2], 1946 N. High St., Columbus, Ohio

Beckley-Cardy Co.[1, 2], 1900 N. Narragansett Ave., Chicago 39, Ill.

A. M. Blood Co.[1], 326 Twentieth St., Rock Island, Ill.

I. A. Bock School Service Co.[1], 628 Park Ave., Sycamore, Ill.

Milton Bradley Co.[1], 811 S. Wabash Ave., Chicago 5, Ill.
Milton Bradley Art & Education Material
Milton Bradley Furniture
American Playground Device Equipment
American Desk Manufacturing Co. Furniture
Complete School Supply & Equipment Line

Brady & Earnhart[1], 215 W. Third St., Marion, Ind.

Brice RCA Sales[2], 4417-19 N. Saginaw St., Flint 5, Mich.

The Charles H. Bunch Co.[1, 2], 337 W. Main St., Louisville 2, Ky.

Burke's Motion Picture Co.[2], 434 Lincoln Way W., South Bend 1, Ind.

Capital Film Service[2], 224 Abbott Rd., East Lansing, Mich.

Carpenter School Equipment Co.[1], Mitchell, Ind.

Central School Supply Co., Inc.[1], 311 W. Main St., Louisville, Ky.

Central Scientific Co.[3], 1700 Irving Park Road, Chicago 13, Ill.

Chemical Rubber Co.[3], 2310 Superior Ave., Cleveland, Ohio

Chicago Apparatus Co.[3], 1735 N. Ashland Ave., Chicago 22, Ill.

Chicago Seating Co.[1], 914 S. Wabash Ave., Chicago 5, Ill.

Church School Pictures, Inc.[2], 1118 Walnut Ave., Cleveland 14, Ohio

Clark Chemical & Supply Co., Inc.[3], 1527 Miller St., Indianapolis 7, Ind.

Cousino Visual Education Service[2], 2325 Madison Ave., Toledo 2, Ohio

Crowley Thompson Chemical Co.[3], Lederer Terminal, Foot of E. 9th St., Cleveland 14, Ohio

Crown School Supply & Equipment Co.[1], 218 S. Wabash Ave., Chicago 4, Ill.

D. T. Davis Co.[2], 178 Walnut St., Lexington 34, Ky.

Dennis Film Bureau, 29 E. Maple St., Wabash, Ind.
Almanac Educational Films
Kiernan Kaleidoscopes Cathedral,
Family and Concordia Religous Films Entertainment,
Features and Short Subjects

DeWald Audio Visual Equipment[2], 4806 S. Logan St., Lansing 10, Mich.

The Dobson-Evans Co.[1], 1100 W. Third Ave., Columbus 8, Ohio
American Seating Co.—school, auditorium and church furniture
Art Supplies, papers and equipment
Athletic supplies and equipment
Blackboards, erasers, chalk and supplies
Ditto and duplicating machines, supplies and papers
Everwear playground equipment
Library, classroom, vocational and office furniture
Maintenance and sanitation equipment and supplies
Pencils, pens, erasers and office supplies
School class registers, records and plan books and forms
School notebooks, tablets, notebook fillers and ream papers
Leavitt bleachers and stadiums
Visual and audio equipment and teaching aids

Eberbach & Son Co.[3], 200 East Liberty St., Ann Arbor, Mich.

Educational Aids Service[2], 3034 Thayer St., Evanston, Ill.

Eldridge Motion Pictures[2], 4145 N. High St., Columbus 14, Ohio

Engleman Visual Educ. Service[2], 4754 Woodward Ave., Detroit 1, Mich.

B. F. Farnell Co.[1], 435 W. 7 Mile Rd., Detroit 3, Mich.
Arlington and American Desk School Furniture
Hamilton Laboratory Furniture
Sjostrom Library Furniture
Bavinco Homemaking Furniture
Rowles Shades and Chalkboards
Fred Medart Gym Equipment
Adjustable Cabinets
Hamilton Bookstacks

Films Unlimited[2], 23 N. Mulberry St., Mansfield, Ohio

Fisher Scientific[3], 1458 N. Lamon Ave., Chicago 51, Ill.

A. Flanagan Co., 730 N. Franklin, Chicago, Ill.

Fletcher Visual Educ. Service[2], 218 W. Main St., Urbana, Ill.

Fried's Audio-Visual Center[2], 103 W. Front St., Bloomington, Ill.

Fryan Film Service[2], 1810 E. Twelfth St., Cleveland 15, Ohio

The Foto Craft Shop, Inc.[2], 154 High St., Hamilton, Ohio

Garden City Educ. Co.[1], 27 S. Wabash Ave., Chicago 3, Ill.

Gary Camera Co.[2], 619 Washington, Gary, Ind.

General Biological Supply House, Inc.[3], 8200 S. Hoyne Ave., Chicago 20, Ill.

Gillespie Visual Educ. Serv.[2], 220 State St., St. Joseph, Mich.

The D. H. Goble Printing Co.[1], 15 S. East St., Greenfield, Ind.

John R. Green Co.[1], 233 Scott St., Covington, Ky.

Hadden Films, Inc.[2], 422 W. Liberty St., Louisville 2, Ky.

Ralph V. Haile & Assoc.[2], 215 Walnut St., Cincinnati 20, Ohio

Harpster Audio Visual Equipment, Inc[2], 13902 Euclid Ave., Cleveland 12, Ohio

Harshaw Scientific, Div. of the Harshaw Chemical Co.[3], 9240 Hubbell Ave., Detroit 28, Mich.
Laboratory Instruments, Apparatus, and Chemicals

Harshaw Scientific, Div. of the Harshaw Chemical Co.[3], 6265 Wiehe Rd., Cincinnati 13, Ohio
Laboratory Instruments Apparatus and Chemicals

Harshaw Scientific, Div. of Harshaw Chemical Co.[3], 1945 E. 97th St., Cleveland 6, Ohio
Laboratory Instruments, Apparatus and Chemicals

G. E. Henry Co.[1], 263 E. Long St., Columbus 15, Ohio

J. R. Holcomb & Co.[1], 1710 E. 22nd St., Cleveland 14, Ohio

Howard & Smith, Inc., 22524 Woodward Blvd., Detroit, Michigan

Ideal Pictures, Inc.[2], 58 E. South Water St., Chicago 1, Ill.

Illini Audio-Visual Educational Service [2], 221 Main St., Peoria, Ill.

Illini Supply Inc.[1], 141 S. Main St., Decatur, Ill.

Illinois School Supply Co., 114-120 S. 7th St., Quincy, Ill.

Indiana Visual Aids Co., Inc.[2], 726 N. Illinois St., Indianapolis 6, Ind.

Jensen, Inc.[2], 427 Detroit St., Flint 1, Mich.

Judy Audio Visual Service[2], P.O. Box 706, Mount Vernon, Ohio

The Kauffman-Lattimer Co.[3], Front and Chestnut Sts., Columbus 16, Ohio
Laboratory supplies and equipment
Reagent Chemicals

Kay Surgical Inc.[3], 242 Jefferson, Lexington, Ky.

Kentucky School Equipment Co.[1, 2], 119 S. Fourth Ave., Louisville, Ky.

Frank W. Kerr Co.[3], 951 Porter St., Detroit, Mich.

Kiger & Co.[1], 1830 West 16th St., Indianapolis 4, Ind.
American Seating Furniture
Draper Window Shades
Hamilton Laboratory Furniture
Mitchell Fold-O-Leg Tables
Weber-Costello Chalkboards, Globes, Maps
Sico Folding Cafeteria Tables
All-Steel Lockers (A.S.E.)
Complete Line School Supplies and Equipment

Krum's Audio Visual[2], 35 E. Michigan Ave., Battle Creek, Mich.
Eastman Kodak, Projectors and Cameras
American Optical, Projection Equipment
Viewlex Projectors
Kodak Verifax Copiers & Supplies
Radiant and DaLite Screens

Theodore Kundtz Co.[1], 1420 W. 25th St., Cleveland 13, Ohio.
Distributors for the following companies in the northern half of Ohio:
Heywood Wakefield Co. Classroom Furniture
Heywood Wakefield Co. Auditiorium Furniture
Heywood Wakefield Co. Cafeteria Furniture
Heywood Wakefield Co. Rest Room Furniture
Hamilton Mfg. Co. Laboratory Furniture
Bavinco Mfg. Co. Home Economics Equipment
John E. Sjostrom Co. Library Furniture
Clarin Mfg. Co. Folding Chairs
Royal Mfg. Co. Typewriter Desks

Lake-Land Educational Sales[2], 401 S. First St., Pierceton, Indiana
Victor Animatograph Corp.
Audio-Visual Aids & Supplies

Arthur S. LaPine & Co.[3], 6001 S. Knox Ave., Chicago 10, Ill.
Laboratory Equipment and Supplies—900 page catalog
Microscopes
Reagent Chemicals
Kimble and Pyrex Glassware
Laboratory Furniture

Leonard Supply Co., Silver Lake, Indiana

Levy's Film & Projection Service[2], 1648 Pullan Ave., Cincinnati 23, Ohio

Link Equipment Co., 1935 Euclid Ave., Cleveland 15, Ohio
Arlington and Norcor school seating
Colonial Eng. Co., Steel Sink and Counter units
Dudley Locks
Mitchell Fold-O-Leg Tables; Band and Choral Stands
Sico Rolling, Folding Combination Table and Bench Units
Steel Age Office Furniture
U. S. Plywood, Armorply Chalkboards

M. E. Lockard Co., 643 N. Howard St., Akron 10, Ohio

Lundgren's Audio Visual[2], 419 7th St., Rockford, Ill.

Madison Printing Service, 87 Safford St., Madison, Ohio

Manse Film Library[2], 2514 Clafton Ave., Cincinnati 19, Ohio

Mapes Brothers, Ogden, Ill.

M. H. Martin Co.[2], 1118 Lincoln Way E., Massillon, Ohio
Bell & Howell Special Rep.
DuKane & Stromberg Carlson Sound Systems
Coronet Films, Sales and Rental
Beseler & American Optical opaque projectors
Screens, tape recorders, filmstrip projectors
Repair Service for projectors and sound equpiment

McFadden Corp.[1], 3011 E. Saginaw St., Lansing, Mich.
Wayne school bus bodies
Brunswick school furniture and cabinets
Horn folding gym seating, partitions and stages
Schieber In-The-Wall, Port-A-Fold and Mobil-Fold tables and benches
Recreation playground, gym and pool equipment
Indiana Desk Co. school and office desks

Indiana Chair Co. school and office chairs
Jasper Table Co. school and office tables
Chas. W. Rice window shades and draperies
Norcor school furniture
All-Steel Equipment Co. files, cabinets, desks, chairs and lockers
Samson folding chairs and tables
Mitchell Fold-O-Leg tables, choral and band stands
Leonard Peterson Laboratory Equipment
Playtime out-door grandstands

The McManus-Troup Co., 713-715 Jefferson Ave., Toledo, Ohio
Folding Chairs and Tables
Filing Cabinets and Supplies
Wood and Steel Office Furniture
Tablet Arm and Student Chairs

Michigan Products, Inc.[1], 1236 Turner St., Lansing, Mich.

Michigan School Service, Inc.[1], Main Box 509, Lansing, Mich.

Midwest Visual Equipment Co.[2], 3518 W. Devon Ave., Chicago 45, Ill.

Miller Office Supply Co.[1], 803 Covington Ave., Piqua, Ohio
American Desk Mfg. Co.—School Classroom Furniture
All-Steel Lockers
Norcor Seating furniture
Walrus Laboratory Equipment
Rice Window Shades and Draperies
International Auditorium Seating
Howell Playground Equipment
Durham Folding Chairs
Atlas Folding Chairs
Sico Folding Tables and Benches

The Miller School and Office Supply Co.[1], 475 Fayette St., Hammond, Indiana
Peabody School and Auditorium Seating
Draper Shades and Blackout Curtains
Knoxville Scenic Stage Curtains and Cyclorama
School Supplies and Equipment
Copyrite Spirit Duplicators

National China & Equipment Corp.[1], 214-18 E. Fourth St., Marion, Indiana

Newman Visual Education Co.[2], 783 W. Main St., Kalamazoo, Mich.
Branch: 1049 Grandville Ave., S. W. Grand Rapids, Mich.
A complete line of Audio-Visual Equipment

Oglesby Equipment Co.[1], 20356 Grand River Ave., Detroit 19, Mich.
Branch 2163 N. Meridian St., Indianapolis, Ind.
Heywood-Wakefield School and Auditorium Seating
E. H. Sheldon Co. Laboratory, Art and Homemaking Equipment
Clarin Folding Chairs
Oneida School Bus Bodies
Mitchell Fold-A-Leg Tables, Band and Choral Stands
Gotham Snap-Type Aluminum Trim
Playground and Gymnasium Equipment
Custom Office Equipment & Furnishings
Wayne Rolling Gymstands, Bleachers and Folding partitions
Interior Steel Lockers, Cabinets and Shelving
Educator's School Furniture and Cabinets
Myrtle Desk Library Furniture

The Orr, Brown & Price Co.[3], Spring & Front Sts., Columbus, Ohio

The Otterbein Press[2], **Audio Visual Dept.**, 252 West 5th St., Dayton 2, Ohio

Photo Service, Inc.[3], 220 Graceland Ave., Des Plaines, Ill.
Headquarters for Audio Visual Equipment & Supplies
Jam Handy Filmstrips and Movies
Ampro Sound Projectors and Tape Recorders
Standard Filmstrip Projectors
DuKane Projectors and Sound Systems

The J. E. Porter Corp., 664 N. Michigan Ave., Chicago 2, Ill.
Complete outfitters for the school and institution

Projection Equipment Co.[2], Union City, Indiana

Nate Quillen Visual Service[2], 281 Cardinal Dr., Champaign, Ill.

Randolph School Supply Co.[1], 708 So. 5th, Champaign, Ill.

Rascher & Betzold Inc.[3], 730 No. Franklin St., Chicago 10, Ill.

W. H. Rodebeck Co.[2], 15 E. Maryland St., Indianapolis 4, Ind.

Rupp and Bowman Co.[3], 315 Superior St., Toledo 3, Ohio

E. H. Sargent & Co.[3], 4647 W. Foster Ave., Chicago 11, Ill.
Branch: 1959 E. Jefferson St., Detroit 7, Mich.
Manufacturers and Distributors of Scientific Laboratory Instruments, apparatus and chemical reagents
Complete service for educational scientific laboratories

Schaar & Co.[3], 754 W. Lexington St., Chicago 7, Ill.

School Equipment Service, 624-26 Bondi Bldg., Galesburg, Ill.
Brunswick-Balke-Collender Co. School Furniture
Brunswick-Horn Folding Gymnasium Seating, Partitions, Stages and Classroom Wardrobes
Recreation Equipment Corp., Basketball and Playground Equip.
Sico Grandstands, Inc.—Portable and Permanent Bleachers
Ideal Seating Co., Auditorium and Stadium Seating

Selected Films, Inc.[2], 345 Walnut, Northfield, Ill.

Shick Supply and Equipment Co.[1], 724 McReynolds, Ave., Danville, Ill.

Smith Audio Visual Service[2], 128 W. Washington, South Bend 8, Ind.

Norris Smitley Sound Service[2], Stellhorn Rd. Rte. 11, Ft. Wayne, Ind.

Standard School Service[1], 107 W. Washington St., St. Louis, Mich.
Janitor Supplies
Maps and Globes
School Seating
Playground Equipment
Office Equipment
School Supplies and Furniture

Standard Science Supply Co.[3], 1231 N. Honore St., Chicago 22, Ill.

O. J. Steffy & Son, Carlisle, Indiana

Steinhardt and Hanson, Inc., Madison, Indiana
Mitchell Folding Tables
Ionia Chairs
General Fireproofing
Metal Office Furniture
Smith Corona Typewriters
National & Burroughs Adding Machines
National Bookkeeping Machines
Old Town Duplicators
Complete Line of School Supplies papers, Janitor Supplies
National Laboratories NL Concentrate
Vani-Sol and Duratex concentrate floor protector

Sunny Schick's, 407 W. Washington Blvd., Ft. Wayne, Ind.

Sunray Films, Inc.[2], 2108 Payne Ave., Cleveland 14, Ohio

Thompson's Sanitary Supply House[1], 761-65 East 7th St., Lexington, Kentucky

Todd Visual Service[2], 16019 Hamilton Ave., Detroit 3, Mich.

Tri-State School Supply Co., 810 Main St., Evansville 8, Ind.

Twyman Films, Inc.[2], 400 W. 1st St., Dayton 1, Ohio

Harry M. Ward Co.[1], 222 No. Walnut St., Bryan, Ohio

Watland Incorporated[2], 13039 S. Western Avenue, Blue Island, Ill.

W. M. Welch Mfg. Co.[3], 1515 Sedgwick St., Chicago 10, Ill.

Wilkens-Anderson Co.[3], 4525 W. Division St., Chicago 51, Ill.

Region 5—Virginia, North Carolina, South Carolina, Washington, D. C.

A. S. Aloe Co.[3], 1501 14th St., N.W., Washington, D. C.

Asheville Showcase & Fixture Co., 57 Broadway, Asheville, N. C.

Beaman's, Inc., 1060 Battleground Ave., P.O. Box 504, Greensboro, N. C.

Below Sound & Visual[2], P.O. Box 653, Bristol, Va.

Bennett Bros., Ltd.[2], P.O. Box 6218, Charlotte, N. C.

R. L. Bryan Co.[3], Audio-Visual Dept., 1440 Main St., Columbia, S. C.
Complete Audio Visual Service
School Supplies

Paul L. Brand & Son[2], 2153 K Street, N.W., Washington 7, D.C.

Cardinal Products, Inc.[3], P.O. Box 1611, Durham, N. C.
Pyrex and Kimble Glassware
Microscopes and Photoelectric Instruments
Merck and Mallinckrodt Reagent Chemicals
Matheson-Coleman and Bell Organic Chemicals
Analytical Balances
General Laboratory Supplies and Equipment

Carolina School Supply Co., Inc[1], P.O. Box 2185, Charlotte, N. C.

Walker C. Cottrell, Jr., 408 E. Main St., Richmond 19, Va.

Dixie Equipment Company, P.O. Box 1026, Liberty, N. C.
Gregson Manufacturing Co. (School and Office Furniture)
Griggs Equipment Co. (School and Auditorium Furniture)
Folding Tables, Chairs
Complete Line of School Furniture

Roy G. Epperly & Co.[2], 725 12th St., N.W., Washington 5, D.C.

The Film Center[2], 915 Twelfth St., N.W., Washington, D.C.

Flowers School Equipment Co.[1, 2], 327 W. Main St., Richmond 20, Va.

Wilson Gill, Inc.[3], 1126 Vermont Ave., N.W., Washington 5, D.C.

Henry B. Gilpin Co.[3], 128-33 W. Main St., Norfolk 10, Va.

M. W. Gunn Co.[1], 901 Summers Ave., Orangeburg, S. C.

Harbin's Inc.[1], 1312 Main St., Columbia 1, S. C.

Hughes Equipment Co.[1], P.O. Box 1628, 1229 Montlieu, High Point, N. C.

Ideal Pictures[2], 219 E. Main St., Richmond 19, Va.

Jones School Supply Co., 1401 Main St., Columbia, S. C.

L. P. Kent & Co., Manufacturers Agents, Washington, D.C.
All-Steel Equipment, Inc.—Lockers, Desks, Files and Chairs
Angle Steel, Inc.—Stools, Benches and Sorting Racks
Krueger Metal Products—Folding Chairs and Chair Trucks
Schwab Safe Company—Safes and Vault Doors

L. D. Lawrence Co., Inc.[1], 937 Main St., Columbia 1, S. C.

John J. Morrison & Sons[1], 605 Main St., Lynchburg, Va.

National School Supply Co., Inc.[3], 14 Glenwood Ave., Raleigh, N. C.
Mastercraft Stage Equipment
Centralized Sound Systems
Curriculum Film Strips
Audio-Visual Equipment
16mm Sound Film Rental Library

Nu-Idea School Supply Co., 127 Harvin St., Sumter, S. C.

Palmetto Pictures, Inc.[2], 721 Saluda Ave., Columbia 11, S. C.

J. H. Pence Co.[1], 119 E. Church Ave., Box 863, Roanoke, Va.

Phipps and Bird, Inc.[3], P.O. Box 2V, Richmond, Va.
Chemicals
Laboratory Apparatus
Laboratory Furniture
Plastic Fabricators
Plastic Supplies

Piedmont Film Service[2], Box 391, Lexington, N. C.

School Equipment, Inc.[1], P.O. Box 585, Siler City, N. C.

Southeastern Equipment Co., Inc.[1], Siler City, N. C.

Southern Desk Co., Drawer 630, Hickory, N. C.

Southern School Service, Inc.[2], P.O. Box 328, Canton, N. C.

Southern School Supply Co., Inc.[1], 108 S. Harrington St., Raleigh, N. C.

Chas. G. Stott & Co., Inc.[1], 1310 New York Ave., N.W., Washington 5, D.C.

Universal School Equipment Co., 3709 Hillsboro St., Raleigh, N. C.

Virginia School Equipment Co., Inc.[1], 104 S. Foushee St., Richmond 20, Va.

A. D. Whitney Co., Inc., 733 W. Cary St., Richmond 20, Va.

Region 6—Tennessee, Mississippi, Alabama, Georgia and Florida

ABC School Supply House, Inc.[1], 3181-D Roswell Rd., N.W., Atlanta, Ga.
Brunswick-Balke-Collender: School Furniture—Chairs, Desks, Book trucks, Cabinets
Horn Division of Brunswick: Stages
Beckley Cardy Company: Simplex Chalkboards, Corkboards, Aluminum Trim

Alabama Photo Supply[2], 15 South Court St., Montgomery, Alabama

Alabama School Supply Co.[1, 2], 1085 N. McDonough St., Montgomery 1, Alabama

Aloe Scientific Division of A. S. Aloe Co.[3], 492 Peachtree St., N.E., Atlanta 3, Georgia

American Seating Co.[1, 2], 354 Nelson St. S.W., Atlanta 3, Ga.
School Supplies
Sunday School Furniture
Theatre and Auditorium Seating
Church Furniture
Stadium Seating
Folding Chairs
Folding Tables
Universal Bleachers
Gymnasium and Playground Equipment
Window Shades
Stage Equipment
Home Economics Equipment

Anderson Surgical Supply Co., 40-42 West Duval St., Jacksonville 1, Fla.

Atlantic Scientific Corp.[3], 1412-20 W. Washington St., Orlando, Fla.
Laboratory Supplies
Laboratory Furniture
Reagent Chemicals
Scientific Instruments
Pyrex and Kimble Glassware

Biscayne Chemical Laboratories[3], 200 N.E. 11th St., Miami 32, Fla.

Bishop Office Equipment, Inc.[1], 204 No. Orange Ave., Orlando, Fla.

Bowen Supply Co.[1], 125 E. Reynolds St., Plant City, Fla.

Bowstead Movie Camera Shop[2], 1039 N. Orange Avenue, Orlando, Florida

Milton Bradley Co. of Ga., Inc., 384 Forrest Ave., N.E., Atlanta 1, Georgia

Barefield School Supply Co., Jackson, Mississippi

Calhoun Co.[2], Visual Education Service, 121 Forrest Ave. N.E., Atlanta 3, Ga.

Gordon S. Cook[2], Box 2306, Fort Lauderdale, Florida

The Distributor's Group, Inc., 756 W. Peachtree St. N.W., Atlanta, Ga.
Filmagic Silicone Cloth

H. & W. B. Drew Co., P.O. Box 270, Jacksonville, Florida
Globe-Wernicke Equipment
Norcor Seating
Weber Costello, Blackboard, Chalk and Erasers
Niagara Duplicators
Printing—Lithographing—Engraving

Estes Surgical Supply[3], 56 Auburn Ave., N.E., Atlanta 3, Ga.

Jasper Ewing & Sons[2], 227 E. Pearl Street, Jackson, Miss.

Florida Distributors, P.O. Box 5476, Jacksonville, Florida
Gotham Chalkboard & Trim Co.—Chalk & Trim Boards, Trim
American Flagpole Equipment Co., Inc.
Recreation Equipment Corp.
Colonial-Hites Co. Metal Letters, departmental signs, numerals
Flush-Metal Partition Corp. Toilet and Shower Stalls
Stage rigging, curtains, black-out materials
Sargent Bldg. Specialties—Incinerators

Hale & Wallace, Inc., 1077 Duncan Avenue, Chattanooga, Tenn.
"Acousti-Celotex" Acoustical Contractors
"Kentile" Floor Covering Contractors
"E W A Rowles" Chalk & Tack Board
"Horn" Folding Gym Seats and Partitions
Lockers, Toilet Partitions & Building Specialties

James A. Head & Co., 2013 First Ave., North Birmingham 3, Ala.
Complete Institutional Equipment for Schools, Libraries, Hospitals and Churches

Highland Products Co.[1], 720 Gay St., Knoxville 8, Tenn.

Ideal Pictures Co.[2], 18 South Third St., Memphis 3, Tenn.

Knight Brothers Paper Co., School Service Div. Sta. G, Box 52, Jacksonville, Florida

Lancaster Associates, John Sevier Hotel Building, Johnson City, Tenn.
Library Furniture and Manual Training Benches
Heywood-Wakefield Furniture
Folding Gym Seating, Folding Partitions
Playground, Gym Equipment
Complete School Equipment Line

Marshall Co., 29 Pryor St., Atlanta, Ga.

Martin School Equipment Co.[1], 303 Hamilton Pl., Box 566 Jackson, Miss.
American Desk Manufacturing Co. School and Auditorium Seating
Howell Playground Equipment
Mitchell Fold-O-Leg Tables, Band and Choral Stands
Peabody Seating Co. School Furniture—Stadium Seats
J. E. Porter Corp. Basketball Backstops, Playground Equipment
Samsonite Folding Chairs and Tables
School, Church and Public Seating—Dormitory Furniture
E. H. Sheldon & Co., Laboratory and Homemaking Equipment
Simmons Co., Hotel Contract Dealers, Dormitory Furniture
Wayne Rolling Gymstands and Bleachers

Tony Martucci Co.[2], 901 Shady Lane, P.O. Box 2695, Orlando, Florida

McGregor Co.[1], P.O. Box 752, Athens, Ga.

McKesson & Robbins, Inc.[3], Birmingham Scientific Div., 1706 First Ave., North, Birmingham 3, Ala.
Pyrex Brand Glass Equipment
Kimble Brand Glass Equipment
Baker, Merck and Mallinckrodt Chemicals
Bausch & Lomb Optical Instruments
American Optical Company Optical Instruments

Medical Supply Co.[3], 230 N.E. 3rd St., Miami 32, Florida

Mississippi School Supply Co.[1, 2], 116 East South St., Jackson, Miss.
Audio-Visual Equipment—Ampro projectors
Full line school furniture and supplies
Outfitter of churches and courthouses
Laboratory Equipment and Folding Chairs
Library Books, Tables, Shades

Modern Talking Picture Service, Inc.[2], 247 Spring St., S.W., Atlanta 3, Ga.

John R. Moffitt Co., Inc.[2], 108 N. McDonough St., Montgomery, Alabama

Nashville Products Co.[1], 158 2nd Ave., N., Nashville 3, Tenn.

Nashville Surgical Supply Co.[3], 401 Church St., Nashville 3, Tenn.

Newton School Equipment Co.[1], P.O. Box 4334, Jacksonville, Florida

Norman Laboratories & Studio[3], Arlington Suburb, Jacksonville 7, Florida
Authorized Holmes Projector Dealer 16-35mm
DaLite Projection Screens
Neumade Storage and Production Products

Orbon Pictures[2], 1615 Hendricks Ave., Jacksonville, Florida

Photo & Sound Co.[3], 166 Church St., P.O. Box 63, Montgomery 4, Ala.

Powers Company, 106 St. Michael St., Mobile 1, Ala.

E. H. Sargent & Co.[3], 3125 Seventh Ave., N., Birmingham 4, Ala.
Manufacturers and Distributors of Scientific Laboratory Instruments, Apparatus and Chemical Reagents
Complete service for Educational Scientific Laboratories

School and Office Supply Co., 407 West Clinch Ave., Knoxville, Tenn.

Sebon, Inc.[2], 404 11th St., Columbus, Ga.
Complete Audio-Visual Sales & Service

Herschel Smith Co.[2], 119 Roach St., Jackson 5, Miss.
Audio-Visual Service and Rental Film Library

Southern Photo and News[2], 608 E. Lafayette St., P.O. Box 503, Tampa 2, Fla.

Southern Scientific Co., 890 New Chattahoochee Ave., N.W., Atlanta, Ga.

Southern Visual Films[2], 687 Shrine Bldg., Memphis 1, Tenn.

Standard School Service[1, 2], Box 3057, 3827 1st Ave., N., Birmingham 6, Ala.

Stevens Pictures[2], 9536 N.E. Second Ave., Miami 38, Fla.

Surgical Supply Co.[3], 1050 W. Adams St., Jacksonville 1, Fla.

Tampa Movie Center[2], 228 S. Franklin St., Tampa 3, Fla.

Taylee Paper Co.[1, 2], 420 S. Front St., Memphis, Tenn.

Technical Products Co.[3], 19 N. Dunlap St., Memphis, Tenn.

Tennessee Equipment & Supply Co.[1], 116 2nd Ave., N. Nashville 3, Tenn.
Medart Products, Inc. Gym Equipment
Leonard Peterson & Co. Science and Library Equipment
Peabody Seating Co., Classroom and Auditorium Seating
Victor Projectors and All Types Audio-Visual Equipment
Schieber Mfg. Co. In-Wall Folding Tables
Samsonite Folding Chairs

Tennessee Office Supply Co., 203 West Clinch Ave., Knoxville, Tenn.

Thompson Teaching Aids[2], Div. of Snap Shot Inc., 615 So. Gay St., Knoxville 2, Tenn.

Walter Paper Co., Inc.[1], 3850 Bird Rd., Coral Gables, Florida

Will Corp. of Ga.[3], 890 New Chattahoochee Ave., N.W., Atlanta 1, Georgia
Laboratory Instruments, Apparatus and Chemicals

Region 7—N. & S. Dakota, Iowa, Minnesota, Wisconsin, Upper Michigan and Manitoba, Canada

A & C Sales Company, 919 2nd Ave., S., Minneapolis 2, Minn.
Irwin Seating Company, Classroom and Auditorium Seating
Loxit Systems, Inc. Floor-laying, Chalkboard & Acoustical Systems
Naden & Sons Electric Scoreboard Co., Basketball, Football & Baseball Scoreboards
Recreation Equipment Corp., Playground & Pool Equipment.
Sico Manufacturing Company, Inc., Cafeteria Tables

Artz Camera Supply Co.[2], 416 S. Main St., Aberdeen, So. Dak.

A. S. Aloe Co.[3], 927 Portland Ave., Minneapolis 4, Minn.

Equipto Div., Aurora Equipment Co., 203 Loeb Arcade, Minneapolis 2, Minn.
Equipto Modern Flow Lockers
Equipto Steel Shelving
Angle Steel Stools
Angle Steel Work Benches
Steel Trucks, cabinets and shop equipment

Brosk Office Supply[1], 5810 Seventh Avenue, Kenosha, Wis.
Heywood Wakefield School Furniture
Samson Folding Chairs; Midwest Tables and Caddies
Imperial Desks; Standard School Chairs
Cram Maps and Globes
Complete line School & Janitor Supplies

Cairo Camera Shop[2], 5815 11th Ave., Kenosha, Wisc.

Carroll Films[2], 512 Nicollet Ave., Minneapolis 2, Minn.

Christie School Supply Ltd., Brandon, Manitoba, Canada

Colborn School Supply Co.[1, 2], Grand Forks, N. D.
Branch: Billings, Montana
Classroom and Office Furniture
Janitor Supplies and Equipment
Audio-Visual Aids
Stage and Auditorium Furnishings
Team and Sports Equipment
Laboratory and Science Equipment

Coleman School Supply Co.[1], Coleman, Wisconsin

Community Camera[2], 506 Main St., LaCrosse, Wisconsin

Decker Brothers, Inc.[2], 205-207 No. Federal Ave., Mason City, Iowa

Eastin Pictures Co., Division of the Eastin Phelan Corp[2], 515-19 Main St., Davenport, Iowa

Eau Claire Book & Stationery Co.[1], Eau Claire, Wisc.
American Crayon Co.
American Seating Co.
Berger steel lockers
Ditto, Inc. duplicators and supplies
Luther O. Draper window shades
Jam Handy Slidefilms and motion picture films
Leavitt knockdown and telescoping bleachers
J. E. Porter Corp.—Gym Equipment
Writing and Bulletin Boards
Complete school supplies and equipment

J. W. Edgerly & Co., Ottumwa, Iowa

Educator Supply Co.[1], 309-11 No. Lawler St., Mitchell So. Dakota
Virco Mfg. Corp. School Furniture and Steel Folding Chairs
Cram Maps and Globes
Leonard Peterson Laboratory Equipment
Weber-Costello Co. Products
Victor Animatograph 16mm moving picture projectors
All-Steel Equipment Co., Lockers and Files, Cabinets and Chairs
Jasper Wood Furniture
Complete Supply and Equipment Service for schools since 1890

E. L. C. Films[2], 57 South 4th St., Minneapolis, Minn.

Elliott Film Co.[2], 1110 Nicolett Ave., Minneapolis 3, Minn.

Epko Film Service, Inc., 631 N. P. Avenue, Fargo, N. Dakota
Complete Audio-Visual Sales and Service

Farnham Stationery School Supply Co.[1], 301 S. 5th St., Minneapolis 15, Minn.

Five Star Pictures[2], **Film & Photo Center**, Lyons, Wisconsin

R. H. Flath Co., 2410 N. 3rd St., Milwaukee 12, Wisc.

Fond Du Lac School Supply Co.[1], 36 S. Main St., Fond Du Lac, Wisconsin
Burke Playground Equipment
DuPont Tontine Shades
A. J. Nystrom Maps
Peabody Seating
Royale School Papers
School Supplies and Equipment

Gallagher Films[2], 853 Shawano Avenue, Green Bay, Wisc.

Haldeman-Homme, Inc.[1], 2580 University Ave., St. Paul 14, Minn.

Hart Audio-Visual Center[2], 26 N. First Ave., E., Duluth 2, Minn.

Hawkins Chemical Co.[3], 3100 East Hennepin Ave., Minneapolis 13, Minn,

Herter's Inc., Waseca, Minn.

Holley School Supply Co.[1], 100 E. Grand Ave., Des Moines 7, Iowa

Hub City School Supply Co.[1], 20 3rd Ave., S. E., Aberdeen, So. Dakota
Peabody Seating Co., School Furniture
Kewaunee Laboratory Equipment
Luther O. Draper Window Shades
Lyon Metal Products
Heyer Spirit Duplicators and Supplies

Hunt's Supply Co.[1], Wautoma 1, Wisc.

Iowa Audio Visual Center[2], 11th & Douglas, Sioux City, Iowa

Laabs, Inc.[3], 1937 West Vliet St., Milwaukee 5, Wisc.

J. S. Latta & Sons[2], 2218 Main St., Cedar Falls, Iowa
Complete school supply and equipment line

Marshfield Book and Stationery Co.[1], Box 127 Marshfield, Wisc.
Irwin Seating Co.—School Desks
Howell Playground Equipment
Charles L. Rice Window Shades
Shaw Walker Office Equipment
Royal Typewriters and National Adding Machines

Metropolitan Supply Co.[1], 602-616 Third St., S. E., Cedar Rapids, Iowa

Meuer Photoart House, Inc.[2], 411 State St., Madison, Wisc.

Midwest Audio-Visual Co.[2], 10 West 25th St., Minneapolis 4, Minn.

Midwest-Beach Company[1], 222 S. Phillips Ave., Sioux Falls, S. D.

Midwest Visual Education Service[2], 2819 Arbor St., Ames, Iowa

Milwaukee Equipment Co.[1], 4221 N. 35th St., Milwaukee, Wisc.
Austral and Emco Classroom Wardrobes
Hamilton Laboratory Equipment
Invincible Steel Desks and Letter Files
Nucite Glass Chalkboards and Aluminum Trim
Sjostrom Library Furniture

Minneapolis School Supply Co.[1], 173 N. W. Bank Bldg., Minneapolis, Minn.

National Camera Exchange[2], 86 So. 6th St., Minneapolis 2, Minn.

National Equipment Co.[2], 7 E. Michigan St., Duluth 2, Minn.

Northern School Supply Co.[1, 2], N P Ave. & 8th St., Fargo, North Dakota
American Seating Co., school furniture
Bell & Howell Co., Projection Equipment
Ditto duplicator and supplies
Draper shades
Medart gymnasium seating and equipment
Mitchell Fold-O-Leg tables, band and choral stands
E. H. Sheldon & Co. Laboratory Equipment
Stagecraft, draperies, hardware and lighting
Weber Costello Co. Hyloplate & Sterling Litesite

Northern Stationers, Inc.[1], 112 South Front St., Marquette, Mich.

Northwest Products Co., 127 W. 10th St., Sioux Falls, S. D.

Northwest Projector & Film Supply[2], 319 E. Central Ave., Minot, N. D.

Photoart Visual Service[2], 844 N. Plankinton Ave., Milwaukee, Wisc.
Audio-Visual Equipment and Sound Systems

Pigott Supply Company, 3815 Ingersoll, Des Moines 12, Iowa
Clarin Manufacturing Co.—Folding Chairs
Mitchell Folding Tables: Band-Choral Stands
Griggs Equipment Co.—School and Auditorium Seating
Schieber In-Wall Tables
Peterson Laboratory Equipment
Leavitt Bleachers

Pratt Sound Films, Inc.[2], 701 3rd Ave., S.E., Cedar Rapids, Iowa

Range Office Supply & Equipment Co., 319 Chestnut St., Virginia, Minn.

J. W. Rhea, 911 Locust St., St. Louis 1, Missouri

Roa's Films, 840 N. Plankinton Ave., Milwaukee 8, Wisc.

Roll-Up Shade-o-Screen Co., 1120 High St., Des Moines, Iowa

St. Paul Book & Stationery Co.[1,2], 55 East 6th St., St. Paul 1, Minn.

Sioux Falls Book and Stationery Co.[1], Sioux Falls, S. D.

Taylor Films[2], 79 3rd St., Huron, S. Dakota

Twin City School Supply Company, Neenah, Wisc.

United Chemical Co.[1], 2115-2119 Como Ave., S.E., Minneapolis, Minn.

George T. Walker & Co.[3], 324-5th Avenue S., Minneapolis, Minn.

H. N. Wikelund & Co., 1409-42nd St., Des Moines, Iowa
Electric Folding Gym Bleachers, In-A-Wall Tables, Basketball Backstops, Chalkboards and Wardrobes

Wisconsin Sound Film Library[2], 3201 W. North Ave., Milwaukee 8, Wisc.

Region 8—Nebraska, Kansas, Missouri

Abbey Rents Co., 3230 Washington Blvd., St. Louis, Mo.

Aloe Scientific, Division of A. S. Aloe Co.[3], 5655 Kingsbury, St. Louis, Mo.
Laboratory Furniture, Apparatus, and Chemicals

Athletic Supply Co., 1110 E. 47th St., Kansas City 10, Mo.
Berlin Chapman Bleachers, Folding Portable and Permanent
Fair-Play Electric Scoreboards
Game-Time Playground Equipment and Folding Steel Chairs
Narragansett Gymnasium Equipment and Apparatus
Rawlings Athletic Equipment

Frank Bangs Co.[2], 231 South Ida, Wichita 1, Kansas

Blackwell-Wielandy Co.[1], 1601 Locust St., St. Louis 3, Mo.

Bowlus School Supply Co.[1], 1015 N. Broadway, Pittsburg, Kansas
American Desk Mfg. Co., Furniture
Durham Folding Chairs
DeVry Sound Projectors
Educators Furniture Supplies
Complete School and Athletic Supplies
Samsonite Folding Chairs—Furniture
Sico Portable Tables and Benches
Hubert Mitchell Stage Equipment
Hussey Mfg. Co. Bleachers

Brains Store[2], 1115 Nicholas St., Omaha 2, Nebraska

Braun-Knecht-Heimann Co.[3], 650 West 8th South, Salt Lake City, Utah

Buxton & Skinner Printing & Stationery Co.[1], 306 N. 4th St., St. Louis 2, Missouri

Church Film Service[2], 6509 N. 32nd St., Omaha 11, Nebraska

The Edwards Press[1], Osceola, Mo.

Embassy Enterprises, Inc.[2], 7366 Winchester Dr., St. Louis, 5, Mo.

Erker Bros. Optical Co.[3], 908 Olive St., St. Louis 1, Mo.

Fisher Scientific[3], 2850 S. Jefferson Ave., St. Louis, Mo.

Fisher Scientific[3], 7722 Woodbury Dr., Silver Spring, Mo.

E. H. Fording Co., 6434 Baltimore Ave., Kansas City 13, Mo.
Fred Medart Products—Gym Apparatus, Basketball Backstops, Scoreboards, Telescopic Gym Seats, Lockers
New York Silicate Chalkboards & Corkboards
Deluxe Storage and Library Shelving
Angle Steel, Inc.—Stools and Shop Equipment
Clarin Folding Chairs
Playtime Outdoor Bleachers

Goldsmith Book & Stationery Co., Wichita 1, Kansas

A. J. Griner Co., Inc.[3], 511 N. Emporia St., Wichita 5, Kansas
Laboratory Equipment & Supplies
Microscopes
Reagent Chemicals
Kimble & Pyrex Glassware
Laboratory Furniture

Hall's[2], 623 Kansas Avenue, Topeka, Kansas

B. R. Harris & Co.[1, 2], 508 Jackson St., Chillicothe, Mo.

Heil Scientific Inc.[3], 214 South 4th St., St. Louis 2, Mo.

Hicks-Ashby Co.[1], 3006 Holmes St., Kansas City 9, Mo.

Hoover Brothers, Inc.[1, 2], 1020 Oak St., Kansas City 6, Mo.

D. E. Hotchkin, Maryville, Mo.

Kansas City Laboratory Supply Co.[3], 307 Westport Rd., Kansas City 6, Mo.

Kansas City Sounds Service Co.[2], 1402 Locust St., Kansas City 6, Missouri
Ampro Exclusive Educational Distributor
Society for Visual Education
Bogen Centralized Sound System
Ideal Pictures Distributors
Audio Visual Supplies, Service & Equipment

J. G. Kretschmer & Co.[2], 315 S. 17th St., Omaha 2, Nebraska
Bell & Howell Projectors, Cameras, Lenses and Repairs
Beseler and American Optical Projectors
Filmstrips of all kinds, combination filmstrip and 2 x 2 Projectors, Lamps, Records
Recording tape, P.A. Systems, Tubes, Audio-Visual and Photo supplies

Lassiter Reminder Co.[2], Uptown Theatre Bldg., Columbia, Mo.

Lewis Film Service, Inc.[2], 1425 E. Central, Wichita 2, Kansas

The Ed McClure Co.[1], 400 Broadway, Kansas City 5, Mo.

Millard-Heath Co.[3], 325 Olive St., St. Louis, Mo.

The Missouri Store Co., 909 Lowry St., Columbia, Mo.

Model Publishing & School Supply Co.[1], 1602-08 Hodiamont Ave., St. Louis 12, Mo.

Modern Sound Pictures, Inc.[2], 1410 Howard St., Omaha 2, Nebraska

Modern Talking Picture Service[2], 1321 Main St., Kansas City 5, Mo.

Mosser-Wolf, Inc.[2], 1107 Massachusetts, Lawrence, Kansas

National Chair & Furniture Co., 1151 South Broadway, St. Louis 4, Missouri

Omaha School Supply Co.[1], 1113-17 Nicholas St., Omaha, Nebraska
Peabody School Seating
Leonard Peterson Laboratory Equipment
Hubert Mitchell Stage Curtains
Binney & Smith Company—Art Materials
Weber-Costello Chalkboard & Maps
School Supplies

J. W. Rhea, 911 Locust St., St. Louis 1, Mo.

Ron Bales Sales Agency, P. O. Box 481, 701 Commercial St., Emporia, Kansas
and Iowa, Nebraska & Missouri
Folding Gym Bleachers, Portable Bleachers, Grandstands
Scoreboards, Basketball Backstops
Classroom Furniture
Laboratory Furniture
Playground Equipment
Lockers & Locks
Folding Chairs and Tables

School and Park Supply Co., Inc.[1, 2], 1650 S. Broadway, Wichita 11, Kansas

School Equipment Service, 4378 Lindell Blvd., St. Louis, Mo.
Brunswick-Horn Folding Gymnasium Seating, Partitions, Stages and Classroom Wardrobes
Recreation Equipment Corp.—Basketball, Playground and Swimming Pool Equipment
Sico Grandstands, Inc.—Portable and Permanent Bleachers
Ideal Seating Company—Auditorium and Stadium Seating

School Specialty Supply[1], Salina, Kansas
School Records
Lunch Room Supplies
Library Supplies
Furniture
Office Supplies

Southwest Scientific Corp.[3], 122 S. St. Francis St., Wichita 2, Kansas
Pyrex and Kimble Glassware
Mallinckrodt and Merck Reagent Chemicals
Mathewson—Coleman & Bell Organic Chemicals
Precision Scientific Equipment
General Laboratory Supplies and Equipment

Stephenson School Supply[1, 2], 935 "O" St., Lincoln 1, Nebraska
Brunswick School Furniture
R. C. A. Sound and Visual Products
Viewlex Projectors
Universal Bleachers
E. H. Sheldon Laboratory Equipment
Draper Shades
Samson Folding Chairs
Stage Equipment

Sterling School Supply Co., Sterling, Kansas

Swank Motion Pictures Inc.[2], 614 No. Skinker Blvd., St. Louis, Mo.

Thatcher, Inc.[1], 424 Quincy, Topeka, Kansas
Peabody School Equipment
Mitchell Stage Installations
E. H. Sheldon Laboratory and Home Economics Equipment
Draper Shades
Rol-Fol Table, Inc.
Samson Folding Chairs

University Publishing Co.[1], 1126 "Q" St., Lincoln 1, Nebraska
Branch: 1508 Main, Kansas City, Mo.
Audio Visual Equipment & Supplies
DeVry Sound Projectors
Ditto duplicators and supplies
Heywood-Wakefield school and auditorium seating
Recreation Playground & Gym Equipment
Wayne Gym Stands and Bleachers
Complete supply and equipment lines

Region 9—Oregon, Washington, Idaho, Montana, ½ Wyoming (Northern)

Alce Scientific, Division of A. S. Alce Co.[3], 1920 Terry Ave., Seattle 1, Wash.

Audio Visual Center, Inc.[3], 1205 North 45th St., Seattle, Wash.

Audio Visual Consultants, Inc., South 17 Washington, Seattle, Wash.

Audio Visual Consultants, Inc., 305 North 9th St., Boise, Idaho

The Caxton Printers, Ltd., 312 Main St., Caldwell, Idaho

Christian Supply Center, Inc.[2], **Audio-Visual Dept.**, 825 S. W. Fourth Ave., Portland, Oregon

Cine Craft Co.[2], 611-15 S. W. 13th St., Portland 5, Oregon

Frank D. Cohan, Inc.[1], 1929 S. W. Sixth Ave., P. O. Box 8802, Portland 7, Oregon
Branch: 419 Third Ave. West, Seattle 99, Wash.
American Desk Mfg. Co.—School and Auditorium Furniture
Berger—Steel Lockers and Shelving
Berlin Chapman Co.—Telescoping Gymseats, Bleachers
Cohan Basket and Rack Equipment
Fair Play Electric Scoreboards and Sports Timers
New York Silicate—Chalkboards and Trim
J. E. Porter Corp.—Gymnasium, Basketball and Playground Equipment
Yale and Towne and Dudley, Locker Locks and Padlocks

Educators Furniture and Supply Co., Inc[1], Civic Business Center, 557 Roy Street, Seattle, Washington
Furniture & Equipment for complete School Installations
"Educators" Factory Built Classroom Cabinets
"Educators" Classroom Furniture
"Samsonite" Classroom Furniture, Folding Chairs and Tables
"Williams and Brower" Wood Chairs
"All Steel Equipment" Steel desks, files and Posture Chairs

C. M. Fassett Co.[3], W. 9 Trent Ave., Spokane 1, Wash.

Fryer-Knowles, 1718 Broadway, Seattle, Wash.
Rol-Fol Table, Inc.
Horn Bros. Folding Gymnasium Seating, Folding Gymnasium Partitions, Folding Stages and Wardrobes
Fire Doors (all types)
Steel Flagpoles

J. K. Gill Co.[1], 408 S. W. Fifth Ave., Portland, Oregon
Branch: 2005 Third Avenue, Seattle 1, Wash.
A. B. Dick Duplicating Products
Norcor Mfg. Co.—School Furniture

Bela School Furniture
Peabody Seating—School Auditoriums
Peterson Laboratory Furniture
Globe-Wernicke Files and Desks
Jasper Office Furniture
Milton Bradley Co.
American Crayon Company
Indiana Chair
Gametime Inc., Playground, Gym Equipment
Textbook Depository for 66 Publishers
Serving Oregon, Washington and Alaska

John W. Graham Co.[1], 708 Sprague Ave., Spokane, Wash.

W. Hassell Electronics[2], 417 W. Yakima Ave., Yakima, Wash.

Inland Audio-Visual Co., N. 2325 Monroe St., Spokane 17, Wash.

Johnson's Incorporated, 23 S. Mission St., Wenatchee, Wash.
A. B. Dick Duplicators

Kelly, Inc., 117 Yale Ave. North, Seattle 9, Wash.
Loxit: Chalkboard Setting System
Loxit: Floor-laying System

Eddie Lewis Motion Pictures[2], 495 Ferry St., Salem, Ore.

Lowman & Hanford Co., 1515 2nd Ave., Seattle, Wash.

Moore's Motion Picture Service[2], 33 N. W. 9th Ave., Portland 9, Ore.

Northern School Supply Co.[1, 2], 1505 Lovejoy St. N. W., Portland 9, Ore.
Branches: 2603 First Ave., Seattle, Wash.; N. 1118 Washington St., Spokane, Wash.; Great Falls, Montana; Boise, Idaho
American Crayon Co.
American Seating Co. School Furniture
Armstrong Cork Bulletin Boards
Duplicators and Supplies
Draper Shades
Medart Gymnasium seating and equipment
E. H. Sheldon & Co. Laboratory and homemaking equipment
Mitchell "Doubler" tables and choral stands
Stagecraft draperies, hardware and lighting
Victor Cameras and projectors
Weber Costello Co. Hyloplate and Sterling Litesite

F. E. Osborne Limited[1], 112 8th Ave. West, Calgary, Alberta, Canada

Owens Motion Picture Service, Inc.[2], 1014 S.W. 2nd Ave., Portland 4, Ore.

Rarig Motion Picture Co.[2], 5514 University Way, Seattle, Wash.

Rosser & Sutton, P. O. Box 1292, Yakima, Wash.

Scientific Supplies Co.[3], 123 Jackson Street, Seattle, Wash.

Shaw Surgical Co., Yamhill & 9th Ave., Portland, Ore.

B. F. Shearer Co.[1], 2318 Second Ave., Seattle, Washington
Branch: 1947 N. W. Kearney, Portland, Oregon
243 Golden Gate Ave., San Francisco, Calif.
1964 South Vermont, Los Angeles, Calif.
Heywood Wakefield School Furniture
Heywood Wakefield Auditorium Chairs
Stage Draperies, Hardware and Lighting
Indiana Desks and Chairs
Clarin Folding Chairs, Midwest Folding Tables
Sico Cafeteria Seating

Guy V. Sweet Company, 1406 E. 50th St., Seattle 5, Wash.
Erickson Fold-A-Way Tables with Benches
Emco Wardrobes
Hamilton Laboratory Furniture and Drawing Tables
Sjostrom Library Furniture and Manual Training Benches
Vogel-Peterson Hat and Coat Racks
Moduwall System of Live-Wall Units

Washington School Supply Co.[1], 1716 Yale, Seattle 1, Wash.
Cram Maps—Globes—Atlases
Rice Steel Roller Window Shades
Wolber Duplicators and Supplies
Brunswick School Furniture and Classroom Cabinets
Complete supply and Equipment Line

Washington School Supply Co., 511 Westlake Ave., North Seattle 9, Wash.

Wholesalers, Inc., 60001 Fairview, Boise, Idaho
Barber Colman Wardrobe door
Colotyle & Colocork—Chalkboards, Tackboards & Metal Trim
Standard Dry Wall Products—Waterproofing materials
Denver Fire Clay Products

Region 10—California and ½ Nevada (Western)

A. S. Aloe Co.[3], 1150 South Flower St., Los Angeles, Calif. and: 500 Howard St., San Francisco 5, California

American Seating Co.[1], 701 Bayshore Blvd., San Francisco, Calif., and: 6900 Avalon Blvd., Los Angeles, Calif.

Armanko Office Supply Co., 152 N. Virginia St., Reno, Nevada

Association Films[2], 351 Turk St., San Francisco, Calif.

Audio Film Center[2], 522 Clement St., San Francisco, Calif.

Austin Safe and Desk Co. Ltd., 1320 Fifth Ave., San Diego, Calif.

Austin Bentley Seating Co., 529 N. LaCierege, Los Angeles 48, Calif.
So. California Distributors for Wayne, Indiana
Wayne Iron Works, Gym Stands
John E. Sjostrom Co., Philadelphia
Library and Laboratory Furniture
Peabody Seating Co., North Manchester
Indiana Auditorium Seating

J. M. Boyd Co.[2], 2032 S. Vermont Ave., Los Angeles 7, Calif.

The Braun Corporation[3], 2260 E. 15th St., Los Angeles, Calif.

Braun-Knecht-Heimann Co.[3], 1400 Sixteenth St., San Francisco 19, Calif.

A. Carlisle & Co.[1], 654 Harrison St., San Francisco, Calif.

Pacific Lab Div. of Central Scientific Co. of Calif.[3], 3555 Whittier Blvd., Los Angeles 23, Calif.

Frank Church Films, Inc.[2], 6117 Grove St., Oakland 9, Calif.

D. J. Clausonthue[2], 1829 N. Craig Ave., Altadena, Calif.

Coast Visual Education Co.[2], 5620 Hollywood Blvd., Hollywood 28, Calif.

Cottage Films[2], 13061 S. Jefferson, Garden Grove, Calif.

H. S. Crocker Co., Inc.[1], 720 Mission St., San Francisco 1, Calif.
Branches: 1141 Fulton St., Fresno 16, Calif.
1201 "K" St., Sacramento 14, Calif.
Arlington Seating School Furniture
Virco Mfg. Corp. School Furniture
Ditto Duplicators and Supplies
Globe-Wernicke Files—Desks
Wilson Athletic Supplies and Equipment
Complete line of Supplies and Equipment

Wm. M. Dennis Film Libraries[2], 2506½ W. 7th St., Los Angeles 5, Calif.

Educators Furniture & Supply Co., Inc.[1], 5912 "R" St., Sacramento 17, Calif.
Furniture and Equipment for complete School Installations
"Educators" Factory Built Classroom Cabinets
"Educators" Classroom Furniture
"Samsonite" Classroom Furniture, Folding Chairs & Tables
"Williams & Brower" Wood Chairs
"All-Steel Equipment" Steel Desks, Files and Posture Chairs
"Globe-Wernicke" vision line wood Library Equipment and the Snead System of Steel Book Stacks

Robert J. Eiel & Associates, 2408 W. 7th St., Los Angeles, Calif.

Caswell C. Elkins Co.[2], 835 Santa Barbara Rd., Berkeley 7, Calif.

Herbert Elkins Co.[2], 10031 Commerce Ave., Tujunga, Calif.

Adolph Frese Corp.[3], 116 W. 17th St., Los Angeles 15, Calif.

Schwabacher Frey Co., 735 Market St., San Francisco, Calif.

Gateway Products, Inc.[2], 1859 Powell St., San Francisco 5, Calif.

Harshaw Scientific[3], **Div. of Harshaw Chemical Co.**, 3237 S. Garfield Ave., Los Angeles 22, Calif.
Laboratory Instruments, Apparatus and Chemicals

K. L. Holst, Audio Visual Education Service[2], 1399 N. Lake, Pasadena 6, Calif.

Jamison Manufacturing Co., 8770 Mettler St., Los Angeles 3, Calif.

Knight's Library[2], 527 University Ave., San Diego 3, Calif.

Marin Motion Picture Service[2], 9 Garden Court, Novato, Calif.

McCurry Foto Co.[2], 8th & Eye Sts., Sacramento 14, Calif.

Merkle Film Library[2], 1734 Pacific Ave., Long Beach 13, Calif.

A. F. Milliron Co.[2], 346 S. LaBrea, Los Angeles 36, Calif.

Morris Brothers, 15 N. Hunter St., Stockton 6, Calif.

National Research and Chemical Co.[3], 1516 Industrial St., Los Angeles 21, Calif.

Photo Sound Co.[2], 116 Natoma St., San Francisco 5, Calif.

Donald Reed Motion Picture Service[2], 8737 Wilshire Blvd., Beverly Hills, Calif.

B. F. Shearer Co., of Calif.[1], 1964 S. Vermont Ave., Los Angeles, Calif.
and: 243 Golden Gate Ave., San Francisco, Calif.

Ty Sidener Audio Visual Sales & Service[2], 3021 Capitol Ave., Sacramento 18, Calif.
RCA & Victor Sound Projectors
American Optical Opaques & Filmstrip Projectors
Radiant Screens, Darkening Drapes, Rice Shades
Califone Players, Educational Records
Bogen School Sound Systems, P. A. Systems
Misc. Tape Recorders, Audio-tape, A. V. Tape Libraries
George F. Cram Co., Maps, Globes, Atlases
Churchill & Misc. Maintenance Supplies and Equipment
Peabody School Seating, Cowan School Furniture

H. K. Smith Films, Inc., 2408 W. 7th St., Los Angeles 5, Calif.

Stationers Corp., 525 S. Spring St., Los Angeles 13, Calif.

Teaching Aids Exchange, 711 Sycamore Ave., Modesto, Calif.

Traid Corporation[2], 4515 Sepulveda Blvd., Sherman Oaks, Calif.

University Apparatus Co.[3], 2229 McGee Avenue, Berkeley 3, Calif.

Valley Office and School Equipment Co.[1], P. O. Box 485, Bakersfield, Calif.

Western Surgical Supply Co.[3], 661 S. Burlington Ave., Los Angeles 5, Calif.

The Wholesale Supply Co.[3], 6500 Santa Monica Blvd., Los Angeles 38, Calif.
"Mallinckrodt" Analytical Reagent Chemicals
Photographic Chemicals
"Ecco" Anti-Static Film Cleaners
"Scotch" Tapes
"LePage's" Glues, Mucilage and Paste

Zellerbach Paper Co., 534 Battery St., San Francisco, Calif.

Region 11—Texas, Oklahoma, Arkansas, Louisiana

All State Supply, Inc.[1, 2], 1401 W. Capitol Ave., Little Rock, Arkansas

A. S. Aloe Co.[3], 1425 Tulane Ave., New Orleans 13, La.

American Desk Mfg. Co.[1], P. O. Box 416, Temple, Texas
Public Seating
School Supplies & Equipment
Teachers Desks
Office Furniture

American Seating Co.[1], 2930 Canton St., Dallas, Texas
Branch: 1703 Bell Ave., Houston, Texas

Association Films, Inc.[2], 1108 Jackson St., Dallas, Texas

Audio Visual Services[2], 1702 Austin St., Houston 3, Texas

The Harve Avants Associates[1], 1200 East Berry, Fort Worth 10, Texas

Bauer Audio Video[2], 2109 N. Haskell, Dallas, Texas

Bickley Brothers[1], 2017 Preston Ave., Houston 2, Texas
Complete furniture for all Grades, High Schools Colleges: including classroom, library, cafeteria, Office, laboratory furniture for arts and sciences, Auditorium and gymnasium seating, basketball backstops, Lockers, chalkboard, tackboard, trim.

Boren-Malone Co.[1], 211 S. Wewoka Ave., Wewoka, Okla.
Athletic Goods and Sportswear
School Supplies & Equipment

Braunlich Equipment Co.[2], 936 S. Canton, Tulsa 12, Okla.

Central Manufacturing Co., 211½ Murray St., Alexandria, La.

Chemical & Laboratory Supply[3], Wichita Falls, Texas

Consolidated Drug Co.[3], 227 S. Peters St., New Orleans 12, La.

Delta Visual Service[2], 815 Poydras St., New Orleans 12, La.

Democrat Printing Co.[1, 2], 114 East 2nd St., Little Rock, Ark.

The Denver Fire Clay Co.[3], 1309 Texas St., El Paso, Texas

Dowling's, Inc.[1, 2], 607 W. Grand Ave., Oklahoma City, Okla.

Clarence J. DuBos & Sons[1], Box 3295, New Orleans, La.

Jasper Ewing & Sons[2], 725 Poydras St., New Orleans, La.
Bell & Howell Company, Projectors and Cameras
Society for Visual Education, Filmstrips, Slides, Projectors
Squibb-Taylor Co., Opaque Projectors
DuKane Corp., Tape Recorders

General Office Supply Co.[1], 622-624 Jefferson St., Lafayette, La.

Greene Bros., Inc.[3], 1812 Griffin St., Dallas, Texas

Griggs Equipment Co.[1], Box 630, Belton, Texas
Auditorium Seating—Genuine Pushback
Movable Chair Desks
Single Pupil Tables and Chairs
Two Pupil Tables and Chairs
Tablet Arm Chairs
Kindergarten Chairs
Library Tables
Folding Tables
Stadium Chairs

Gulf States Equipment Co.[1], 1305-7 So. Akard St., Dallas 1, Texas

F. F. Hansell Brothers, Ltd.[1], 131 Carondelet St., New Orleans 12, La.

Harshaw Scientific[3], **Div. of Harshaw Chemical Co.**, 6622 Supply Row, Houston 11, Texas
Laboratory Instruments, Apparatus and Chemicals

Heister's School Supply, 214-216 Chickasha Ave., Chickasha, Okla.

Hertner's Camera Store[2], 114 W. 6th Ave., Amarillo, Texas

W. C. Hixson Company[3], 205 N. Austin St., Dallas 2, Texas
Kewaunee Laboratory Furniture and Hospital Casework
Mutschler Cooking and Sewing Laboratory Cabinetry
DeLuxe Library and Storage Shelving (steel)
Medart Gym Seats, Lockers, Wardrobes, Basketball Backstops, Wire Baskets and shelving
N. Y. Silicate Chalkboard, Tackboard, and Display Cases
Playtime Bleachers and Choral and Band Risers
Acme Side Coiling Partitions
(Gymnasium and all-purpose Rooms)
Erickson Fold-A-Way Tables
Banquet Tables and Folding Choral and Band Risers
Grade-Aid Steel Cubicles and Clay Carts
Also: Folding chairs, locker locks, wood wardrobes gymnasium wall padding, etc.

W. A. Holt Co., Inc., 113 N. 5th St., Waco, Texas

Hoover Brothers, Inc.[1], Temple, Texas

Ideal Building Materials, Inc., 1730 Clairborne Ave. (Box 1545) Shreveport, La.
Chalkboard—Tackboard—Trim
Lockers, Baskets, Racks, Etc.
Folding Bleachers, Stages, Partitions
Builders Hardware
Gym Equipment
Folding Doors
Acoustical Treatment

Industrial Scientific, Inc.[3], 1014 Taylor St., Fort Worth 1, Texas

Institutional Supply Co.[1], 1111 N. E. 23rd St., Oklahoma City 5, Okla.

Lone Star Seating Co., P. O. Box 1734, Dallas, Texas
Lyon—Krueger Folding Chairs, Berlin Bleachers

Laboratory Supply Dept., I. L. Lyons & Co.[3], 800 Techonpitoulas St., New Orleans, La.

Mallory's, 128 Clarksville St., Paris, Texas

Metal Specialties Company, 1525 Elysian Fields Ave., New Orleans, La.
Stainless Steel Sink and Counter Tops
Chalkboards, Corkboards and Bulletin Boards
Laboratory and Homemaking Class Room Equipment
Loxit Floor Systems for Gymnasiums
Formica Counter Tops

Miller's Visual Aids, Inc.[3], 519 Pennsylvania Ave., Ft. Worth, Texas

Louisiana Educational Service[3], Box 1386, Baton Rouge, La.

The Mine and Smelter Supply Co.[3], 1515-11th St., El Paso, Texas

Modern Theatre Equipment Co., 1916 Jackson St., Dallas, Texas
Complete Theatre and Stage Equipment
16mm Equipment—Bell & Howell
Rentals and Repair Service
Draperies and Floor Coverings
We have served Texas on above for 36 years.

Murray-Baker-Frederic, Inc.[3], New Orleans, La.

Oklahoma Seating Co.[1], 19 W. Main St., Oklahoma City 2, Okla.

H. C. Parker, Inc., 336 Camp St., New Orleans, La.

Parkin Printing & Stationery Co., 213-215 Main St., Little Rock, Arkansas

Practical Drawing Co.[1], 2205 So. Lamar St., Dallas 2, Texas

Refinery Supply Co.[3], 621 East 4th St., Tulsa, Okla.

Rowley Co., Inc.[1], 619 Baronne St., New Orleans 12, La.

E. H. Sargent & Co.[3], 5915 Peeler St., P. O. Box 6703, Dallas 19, Texas
Manufacturers and distributors of Scientific Laboratory Instruments, Apparatus and Chemical Reagents. Complete Service for Educational Scientific Laboratories.

School Products Co.[1], 2920 Chartres St., New Orleans 15, La.

Donald L. Smith, Co.[2], 1110 Main Ave., San Antonio 6, Texas

W. G. Smith Co.[1], 100 West 12th St., Houston 8, Texas
Leonard Peterson Laboratory Furniture
Home Economics Furniture
Library Furniture
Auditorium Seating
Draper Darkening Shades
Leavitt Corporation Telescoping Bleachers
Knockdown Bleachers
Steel Grandstands
Add-A-Seat Stadium
Lockers
Claridge Product Chalkboards
Bulletin Boards
Aluminum Trim
Natural Slate Blackboards
Playground Equipment
Everwear Basket Ball Backstops

Sound Photo Equipment Co.[2], 1012 Main St., Lubbock, Texas

Southern Seating Co., 614 Gravier St., New Orleans, La.

Southwestern Seating Co.[1], San Antonio, Texas

Charles G. Stidham Co.[2], 1508 Fredericksburg Rd., San Antonio 1, Texas

Texas Educational Aids[2], 125 S. Broadway, Tyler, Texas

Thompson Book & Supply Co.[1], 926 E. Main St., Ada, Okla.

Visual Education, Inc.[3], 12th & Lamar, Austin 2, Texas

Region 12—Utah, Arizona, Colorado, New Mexico & ½ Nevada (eastern) and ½ Wyoming (southern)

Akin & Bagshaw[2], 2027 E. Colfax Ave., Denver 6, Colo.

Allen School Supply Co., 58 So. MacDonald St., Mesa, Arizona

American Paper & Supply Co.[1], 444 S. 2nd West, Salt Lake City 4, Utah

American School Supply Co.[1], 1514 Arapahoe, Denver 2, Colo.

Bailey School Supply, Casper, Wyoming

F. G. Burton Co.[1], 65 W. Third So., Salt Lake City, Utah

Centennial School Supply Co.[1], Terminal Annex, Denver 17, Colorado

Clico Laboratory and X-ray Supplies[3], 335 W. McDowell Rd., Phoenix, Arizona

The Denver Fire Clay Co.[3], 121 7th St., N.W., Albuquerque, New Mexico

The Denver Fire Clay Co.[3], 2301 Blake St., Denver 17, Colo.

The Denver Fire Clay Co.[3], 225 West South Temple, Salt Lake City 1, Utah

Desert Book Co.[2], Unit 10, 44 East South Temple St., Salt Lake City 10, Utah
Bell & Howell Special Representative
Audio-Visual Equipment: Sales & Service

Film Rental Library: Educational And Entertainment Selections
Screens, tape recorders, film-strip, opaque slide projectors and record players

Ecker's Projection Sales[2], 270 S. Main, Salt Lake City, Utah

Ideal Pictures Corp.[2], 714 18th St., Denver, Colo.

Kelton Audio Equipment Co.[2], 812 No. 1st St., Phoenix, Arizona

Marston Supply Co.[1], 324 No. Central Ave., Phoenix, Arizona

Mine & Smelter Supply Co.[3], 1422 17th St., Denver 17, Colo.

Movie Center Inc.[2], 119 W. McDowell Rd., Phoenix, Arizona

New Mexico School Supply, Box 457, Albuquerque, New Mexico

PBSW Supplies and Equipment Co.[1], Box 551, 530 W. Wash. St., Phoenix, Arizona

Salt Lake Desk Exchange[1], 623 South State St., Salt Lake City, Utah

School and Sports Supply Co.[1], 326 W. Jefferson, Phoenix, Arizona
Brunswick-Balke-Collender Co.—school furniture, bleachers
Rawlings Sporting Goods Co.—sporting goods
Pennsylvania Rubber Co.—sporting goods
J. E. Porter Corp.—Sporting & Recreation Equipment
Dodge Inc.—trophies
Milton Bradley Co.—art supplies
Republic Steel Corp.—Berger Division—Lockers, shelving, etc.
Clarin Chair Company—folding chairs
Columbia Ribbons and Carbon Pacific Co.—master units, Ditto Fluid, etc.
Eagle Pencil Co.—pencils
Western Tablet and Stationery Co.—paper
Leird Mfg. Co.—Church pews and furnishings

H. W. Taylor Co., Inc., 2378 S. State St., Salt Lake City 15, Utah
Wayne Rolling Gymstands
Erickson Folding Cafeteria Tables
Erickson Folding Stages, Band & Choir Risers
Weber Laboratory & Home Economics Equipment
Son-Nel Chalk & Tack Boards
Recreation Basketball Backstops
Fair-Play Scoreboards

Utah-Idaho School Supply Co.[1, 2], 155 So. State St., Salt Lake City, Utah

Visual Aids Center[2], 1657 Pennsylvania St., Denver 3, Colorado

Wentworth Co.[1], Box 577, 415 Copper Ave., Albuquerque, New Mexico

Z.C.M.I. Audio-Visual Products[2], 158 Motor Ave., Salt Lake City, Utah

Z.C.M.I. School & Office Supply[1], 29 East First So., Salt Lake City 10, Utah

FOREIGN

V. J. Villoza Y Cia, Apartado 4390 Del Este, Caracas, Venezuela
Barcol—Wardrobe door—chalkboard or tackboard
Barcol—Overdoor for garage, Electronically controlled etc.
A. O. Smith—Automatic electric water heater and Air conditioners, etc.
Burglar Alarms electronically controlled, etc.
Evershed & Vignoles, Ltd.—Electronic instruments for precision measurements, etc.
Mullard Overseas Ltd.—Electronic equipment
Electrical Lighting and Clocking Devices



During 1954 a major part of the effort to provide new school buildings for the nation's children was directed to constructing new elementary schools. One of the new elementary schools now in use is the Royal Oaks School in Duarte, California. The architect is Maynard Lyndon.

EDUCATIONAL BUILDING IN 1954

by THE EDITORS

American School and University

FOR the sixth consecutive year the AMERICAN SCHOOL AND UNIVERSITY has undertaken the task of reporting to its readers the status of school building construction in the United States. Data on the volume and cost of school building for 1954 are presented, based on replies received from a mailing of 13,457 questionnaires sent to public and private schools, junior colleges and colleges and universities throughout the nation.

All Educational Buildings

Total expenditures for all school building construction in 1954 exceeded the 2.85 billion dollar mark. The total number of buildings jumped from 7,560 in 1953 to 9,147 in the year 1954.

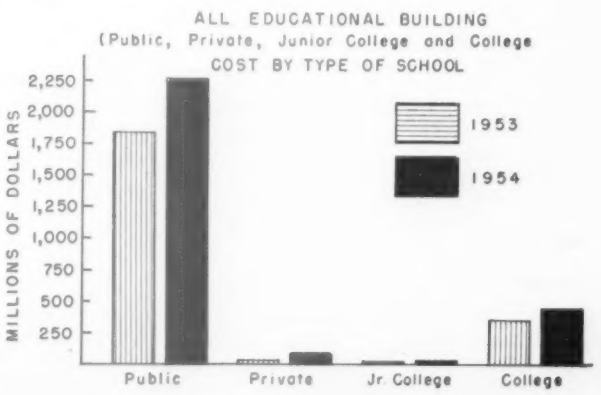
Included among the new school buildings are 4,460 additions constructed during 1954, 49 percent of the total figure.

Public School Buildings

In 1954, 3,981 school systems built 7,567 new buildings, costing $2.26 billions. Public school construction alone exceeded the total of all educational building (7,560 new buildings) in 1953.

The volume of elementary school construction was 69 percent of the total for public schools, but the costs involved were only 50 percent of the total amount. Larger sites and more extensive activity facilities and equipment in secondary schools were the cause of some of this difference.

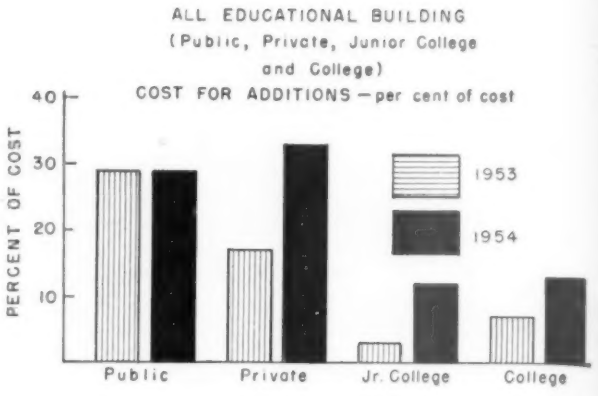
New secondary school buildings accounted for 20 percent of all public school construction and 35 percent of the total cost. Eleven percent of all public school buildings were combination schools, constructed at 15 percent of the total cost.



All Educational Building
(Public, Private, Junior College and College)
1952-53-54

Number of Buildings by Regions

Region	1952		1953		1954	
	Number	Percent	Number	Percent	Number	Percent
South	1670	29	2543	33	2737	30
New England	413	7	391	5	412	4
Central	1667	29	2391	32	3020	33
Middle Atlantic	778	13	726	10	1171	13
Western	1318	22	1509	20	1807	20
TOTAL	5846	100	7560	100	9147	100



The South and Central regions of the country had the greatest number of new schools (2,253 and 2,627, respectively), while the Central and Middle Atlantic states spent more money for their schools (31 percent and 28 percent of the total amount).

There were a total of 71,389 rooms (including gymnasiums, lunchrooms, etc.) added to our nation's public schools by the new buildings constructed in 1954. The buildings have an estimated capacity of 2,372,000 students.

Public School Building
1952-53-54

Number of Buildings by Regions

Region	1952		1953		1954	
	Number	Percent	Number	Percent	Number	Percent
South	1270	28	2154	33	2253	29
New England	293	6	303	5	280	4
Central	1408	31	2053	32	2627	35
Middle Atlantic	536	11	614	10	884	12
Western	1084	24	1304	20	1523	20
TOTAL	4591	100	6428	100	7567	100

Private School Construction

There was an increase in 1954 in the number and cost of new private school buildings. Three hundred and fifteen private school systems spent $108,980,540 for 687 new buildings. Of the total number of new schools, 65 percent were elementary schools, 25 percent were secondary schools and 10 percent were combination schools. In 1953, 54 percent of the new private schools were secondary facilities.

Most private school construction was in the Southern (29 percent), Central (28 percent) and Middle Atlantic (23 percent) regions. Of the 687 buildings, 550 were constructed in these regions.

Junior College Buildings

Last year 103 junior colleges constructed 165 new buildings. The total cost was $35,068,055, with the Western states spending more than half (52 percent) of this amount. All other regions, except for New England, showed a decrease in the number and cost of new buildings.

All Educational Building
(Public, Private, Junior College and College)
1952-53-54

Cost of Buildings by Regions

Region	1952		1953		1954	
	Amount	Percent	Amount	Percent	Amount	Percent
South	$374,720,817	18	$507,879,029	23	$580,818,231	20
New England	187,053,705	9	154,215,434	7	168,033,537	6
Central	642,699,490	31	706,310,416	31	816,369,866	29
Middle Atlantic	518,774,178	24	428,322,985	19	761,353,851	27
Western	381,052,742	18	453,662,387	20	528,181,074	18
TOTAL	$2,104,300,932	100	$2,250,390,251	100	$2,854,756,559	100

More stadiums and gymnasiums were constructed for junior colleges than in 1953 (19 percent of the total number in 1954, 7 percent in 1953). The largest decrease was in dormitory and residence facilities, from 35 percent in 1953 to 17 percent in 1954.

Colleges and Universities

In 1954, $446,331,381 were spent by the nation's colleges and universities for 728 new buildings. The Western and Middle Atlantic states together, the only areas to show an increase, spent 57 percent of the total amount. With 115 new buildings, the Middle Atlantic states almost doubled their number of new college buildings over the previous year (65 new buildings).

Twenty-nine percent of all costs were for new medical facilities. The number of new dormitories jumped from 175 in 1953 to 234 in 1954.

Number of Stories

One story buildings comprised 82 percent of all public school buildings constructed during 1954. Sixteen percent were two story structures and 2 percent of the buildings were three stories in height. In the Western states 97 percent of all new schools were one story.

Construction and Price Trends

The volume of construction and total expenditures for school buildings continues to rise. There has been a continued increase in the amounts and cost of construction for public schools, with a marked gain in volume for private schools. The expenditures for college buildings increased from the year 1953 to 1954, but still have not reached the amounts for 1952. Junior colleges, also, have not reached the peak expenditures and volume of construction evidenced during 1952.

Unit costs for new buildings have reached an all time high. This is a different picture from 1953 when

Public School Building
1952-53-54

Number of Buildings by Type of School

Type of School	1952		1953		1954	
	Number	Percent	Number	Percent	Number	Percent
Elementary	3034	67	4100	64	5245	69
Secondary	1271	27	1598	25	1496	20
Combination	286	6	730	11	826	11
TOTAL	4591	100	6428	100	7567	100

Public School Building
1952-53-54

Cost by Type of School

Type of School	1952		1953		1954	
	Amount	Percent	Amount	Percent	Amount	Percent
Elementary	$829,246,725	54	$957,280,614	52	$1,136,006,946	50
Secondary	652,001,337	42	681,236,297	37	783,197,660	35
Combination	65,587,896	4	191,784,344	11	345,171,977	15
TOTAL	$1,546,835,958	100	$1,830,301,255	100	$2,264,376,583	100

Public School Building
1952-53-54

Cost of Buildings by Regions

Region	1952		1953		1954	
	Amount	Percent	Amount	Percent	Amount	Percent
South	$247,493,753	16	$390,058,424	21	$460,903,616	20
New England	139,215,236	9	129,634,563	7	135,209,341	6
Central	494,987,507	32	535,241,718	29	698,936,890	31
Middle Atlantic	386,708,990	25	379,082,610	21	627,842,663	28
Western	278,430,472	18	396,283,940	22	341,484,073	15
TOTAL	$1,546,835,958	100	$1,830,301,255	100	$2,264,376,583	100

building costs were at almost the same level in December as in the previous January. Although there was no spectacular rise in costs in 1954, such as in 1950 when the building costs index rose thirteen points, a slight increase was noted. Price rises on structural materials late in the year were responsible for this peak level.

A major factor in the present peak in construction costs has been the relatively small, but constant rise in the costs for building labor. It was estimated in December that building labor costs would show an increase of from 5 to 6 percent for the year.

School bond interest rates declined during 1954. The past year has showed a drop in interest rates inversely comparable to the rise in 1953. This decline and the resulting low level of interest rates were due primarily to the control exerted by the United States Treasury and the Federal Reserve Board. Stimulation of business and residential housing was the aim of these reduced rates. The continued control by the United States Treasury and the Federal Board suggests that interest rates are likely to remain at relatively low levels.

Design Trends

One story structures seem to be more in evidence wherever school buildings are constructed. This trend seems to be part of the general tendency to effect economy in school plant construction. Other ways in which newer buildings reflect the effort to achieve structural economy are by means of lighter construction, greater use of the out-of-doors and more multi-use spaces. While one story plans indicate an open quality of design, there is a movement toward a unity of the total school plant as well as unity among individual areas.

In general, elementary school buildings are the results of better planning than is now given to new secondary schools and college buildings. All buildings, however, show that considerable effort is being made to obtain economy of construction. Many architects have designed buildings with the structural elements exposed. Thus the structure and finish are combined, resulting in a saving of cost.

Regardless of the climatic conditions, many new school designs provide for greater use of the out-of-doors. The campus-type plan, in particular, tends to utilize all the educational advantages of larger site plots.

It is felt that not enough interior flexibility of areas is being incorporated into school designs. There seems to be inadequate provision for the future expansion of new structures. Also, large structural elements and the materials being used are not receiving the careful attention often required.

The time allotted for the educational planning of a new school building is, in many cases, inadequate to permit solutions which will meet all the educational needs of a community.

The campus plan is now becoming evident as a design solution for new schools. The variety of other plans also appearing indicates a constant pursuit of better and better educational and architectural solutions for new plant designs. There is a continual effort being made to provide school facilities which radiate a warm, personal atmosphere for students and teachers alike. The traditional aspects which gave an institutional appear-

Private School Building
1952-53-54
Number of Buildings by Regions

Region	1952		1953		1954	
	Number	Percent	Number	Percent	Number	Percent
South	40	24	35	19	197	29
New England	35	21	26	14	65	9
Central	10	6	72	39	192	28
Middle Atlantic	51	31	28	15	161	23
Western	30	18	24	13	72	11
TOTAL	166	100	185	100	687	100

Private School Building
1952-53-54
Cost of Buildings by Regions

Region	1952		1953		1954	
	Amount	Percent	Amount	Percent	Amount	Percent
South	$4,289,133	17	$4,091,668	13	$28,397,065	26
New England	6,307,548	25	6,609,616	21	11,488,192	11
Central	2,270,717	9	13,848,720	44	25,549,445	23
Middle Atlantic	10,092,078	40	5,980,129	19	30,417,008	28
Western	2,270,717	9	944,231	3	13,128,830	12
TOTAL	$25,230,193	100	$31,474,364	100	$108,980,540	100

Junior College Building
1952-53-54

Cost of Buildings by Type

Type of Building	1952		1953		1954	
	Amount	Percent	Amount	Percent	Amount	Percent
Administration	$12,166,395	23	$ 2,110,233	8	$ 736,396	2
Agriculture	——	—	326,335	1	522,134	1
Dormitory and Residence	4,093,368	8	6,997,781	24	3,720,659	11
Education and Liberal Arts	7,061,650	13	531,500	2	6,225,274	18
Engineering	——	—	1,800,000	6	303,799	1
Home Economics	——	—	208,000	1	123,799	1
Library	2,419,091	5	6,621,124	24	3,448,366	10
Physical Education	4,385,485	9	2,392,809	9	6,128,584	17
Science	9,129,629	17	460,000	2	7,382,764	21
Service Facilities	2,243,086	4	1,357,263	5	2,098,310	6
Student Center	391,701	1	1,716,088	6	1,095,569	3
Vocational-Commercial	2,779,058	5	687,014	2	1,874,485	5
Multi-purpose and Misc.	7,723,597	15	2,805,233	10	1,407,916	4
ALL TYPES	$52,393,060	100	$28,013,380	100	$35,068,055	100

Junior College Building
1952-53-54

Cost of Buildings by Regions

Region	1952		1953		1954	
	Amount	Percent	Amount	Percent	Amount	Percent
South	$12,574,305	24	$ 5,936,635	21	$ 6,893,665	20
New England	3,143,583	6	11,000	1	676,299	2
Central	6,287,167	12	12,735,201	45	7,524,545	21
Middle Atlantic	6,811,097	13	4,805,335	17	1,909,730	5
Western	23,576,878	45	4,525,209	16	18,063,816	52
TOTAL	$52,393,060	100	$28,013,380	100	$35,068,055	100

ance to schools of the past have been rejected by most modern planners.

Use by the Community

Not too many years ago school facilities were planned for the accepted daytime school curriculum, and the doors were usually closed during the evening hours. The building practices of recent years, and especially in 1954, show a decided emphasis on planning school facilities for use by all citizens. Often this planning is revealed in the arrangement and relationships of basic spaces. Some degree of isolation of certain facilities is provided so that adults may use them.

One of the most hopeful signs found in the school building practices of 1954 is this recognition of the need for providing facilities in the school for use by all age groups. The continued emphasis during the past years on this phase of school planning is now bearing real results.

Auditoriums and Science Rooms

The auditoriums in new buildings definitely seem to be smaller in size than their older counterparts. Pressing cost requirements have influenced this trend, long advocated by educators for educational purposes. Economizing auditorium costs has also brought about a

more reasonable approach to stage lighting. No longer do school planners feel that the high school auditorium requires a full complement of stage lights and accessories comparable to those of the professional stage.

Sites for Schools

Although 1954 revealed a definite improvement in site use and a trend toward larger sites, closer attention needs to be given to site selection and planning. The December, 1953, report of the "Status Phase of the School Facilities Survey," prepared by the U.S. Office of Education, shows that only 3 percent of the school sites in 43 states were 15 or more acres in size.

The AMERICAN SCHOOL AND UNIVERSITY 1954 building study reveals that the average size of school sites is increasing. Sites for the new school buildings of 1954, as reported by participants in the study, ranged from extremely small plots under one acre in size to plots of 120 acres.

Flexibility within the Classroom

Movable bookshelves and storage spaces are replacing the built-in variety in many new schools. Sometimes storage areas are installed as movable partitions which also serve as space and room dividers. There are

Junior College Building
1952-53-54
Number of Buildings by Regions

Region	1952		1953		1954	
	Number	Percent	Number	Percent	Number	Percent
South	92	41	76	48	46	28
New England	16	7	1	1	12	7
Central	24	11	27	17	24	14
Middle Atlantic	18	8	19	12	11	7
Western	74	33	35	22	72	44
TOTAL	224	100	158	100	165	100

Junior College Building
1952-53-54
Number of Buildings by Type

Type of Building	1952		1953		1954	
	No.	Percent	No.	Percent	No.	Percent
Administration	12	5	9	6	5	3
Agriculture	—	—	4	3	3	2
Dormitory and Residence	17	8	55	35	28	17
Education and Liberal Arts	29	13	8	5	15	9
Home Economics	—	—	4	3	3	2
Library	14	6	13	8	14	8
Science and Engineering	29	13	6	4	19	11
Service Facilities	46	21	16	10	20	12
Stadium and Gymnasium	41	18	11	7	31	19
Student Center	5	2	13	8	8	5
Vocational-Commercial	13	6	5	3	11	7
Multi-Purpose and Misc.	18	8	14	8	8	5
ALL TYPES	224	100	158	100	165	100

College Building
1952-53-54
Number of Buildings by Type

Type of Building	1952		1953		1954	
	No.	Percent	No.	Percent	No.	Percent
Administration	78	9	88	11	28	4
Agriculture	43	5	20	3	44	6
Architecture	—	—	—	—	3	1
Dormitory and Residence	182	21	175	21	234	32
Education and Liberal Arts	112	13	69	9	64	9
Engineering	9	1	21	3	10	1
Law	9	1	—	—	5	1
Library	61	7	58	7	53	7
Medical	8	1	5	1	28	4
Science	121	14	74	9	98	13
Service Facilities	69	8	47	6	34	4
Stadium and Gymnasium	69	8	60	8	63	9
Student Center	43	5	63	8	43	6
Vocational-Commercial	26	3	19	3	5	1
Multi-purpose and Misc.	35	4	90	11	16	2
ALL TYPES	865	100	789	100	728	100

College Building
1952-53-54
Number of Buildings by Regions

Region	1952		1953		1954	
	Number	Percent	Number	Percent	Number	Percent
South	268	31	278	35	241	33
New England	69	8	61	8	55	8
Central	225	26	239	30	177	24
Middle Atlantic	173	20	65	8	115	16
Western	136	15	146	19	140	19
TOTAL	865	100	789	100	728	100

movable and combination chalkboards and tackboards now in use which create multi-use partitions and walls.

The Planning Process

Cooperative planning of schools has not yet reached an ultimate phase of development, but there have been several outstanding examples. Cooperative planning not only makes it possible to plan better buildings, but those communities which have engaged in such ventures have found that the new school then receives greater support from the community. This is an added incentive for those who are embarking on a building program.

A major problem confronting architects and educators is the lack of time available to do a thorough job of planning a new school building. When possible, cooperative planning should begin months before the building program gets underway.

Environmental Factors

There have been few outstanding improvements in the aspects of school plant construction which have to do with environmental factors. Zoned or unit controls continue to be in use in the heating and ventilating of a building, and more attention is being given to acoustical treatments.

Studies indicate that the costs of mechanical installations are rising. This is often caused by elaborate and even unnecessary overdesign of reserve facilities and controls. Further improvements should lead toward economies that would not detract from the desirability of the facilities provided.

The top lighting of building areas has become quite a common method of lighting. This has been achieved with daylight or artificial lighting techniques or with combinations of both. Some difficulties with top lighting have to be worked out necessarily, but continued improvement of materials and design may cause this method of lighting to become accepted generally. In 1954 there was considerable experimentation with glass blocks as a means of skylighting school buildings. Previously, most top lighting was effected with glass or plastic bubbles.

Important advances in lighting techniques have come from increased acceptance of the quality of light as a predominant influence on good lighting. For some time architects have been questioning the desirability of high intensity illumination and studies have shown that brightness differences need more consideration than heretofore.

On the deficit side of the moves toward economy in school building design and construction was the continued emphasis on elaborate gymnasiums. There appears to be little indication of reducing costs for such facilities in scale with the rest of the school building.

Elaborate and often overdesigned cafeterias and kitchens add their share to unnecessary school building costs. It is felt that careful study should be made of these particular areas so that reasonable economies can come about.

Rehabilitation of Old Buildings

Considerable attention and effort is now being given to the rehabilitation of old school buildings. After thorough study, many communities have decided that they can help solve the classroom shortage by modernizing existing old facilities, rather than to abandon or keep in use obsolete and unsafe structures.

The Dilemma We Face

In 1954 a major portion of the building effort was directed toward providing new elementary schools. This was necessary, of course. However, the bulge of student enrollments is beginning to reach the upper elementary grades. This will soon move on to the secondary schools where an increased holding power is already creating overcrowded situations.

The American Association of Collegiate Registrars and Admission Officers, in their report, "The Impending Tidal Wave of Students," state that for every three students enrolled in high schools in 1954, four will be enrolled in 1960. In 1965 there will be five students enrolled for every three that are currently enrolled.

College and junior college building construction must also increase greatly. In addition to the need for

College Building
1952-53-54

Cost of Buildings by Regions

Region	1952		1953		1954	
	Amount	Percent	Amount	Percent	Amount	Percent
South	$110,363,596	23	$107,792,302	30	$ 84,623,885	19
New England	38,387,338	8	17,960,255	5	20,659,705	5
Central	139,154,099	29	144,484,777	40	84,358,986	19
Middle Atlantic	115,162,013	24	38,454,911	11	101,184,450	22
Western	76,774,675	16	51,909,007	14	155,504,355	35
TOTAL	$479,841,721	100	$360,601,252	100	$446,331,381	100

College Building
1952-53-54

Cost of Buildings by Type

Type of Building	1952		1953		1954	
	Amount	Percent	Amount	Percent	Amount	Percent
Administration	$43,185,755	9	$41,969,802	12	$ 9,537,089	2
Agriculture	23,992,086	5	3,445,210	1	14,371,759	3
Architecture	——	—	——	—	1,396,337	1
Dormitory and Residence	81,573,093	17	60,479,635	17	96,939,594	22
Education and Liberal Arts	71,976,258	15	21,410,529	6	26,432,052	6
Engineering	4,798,417	1	10,404,177	3	5,240,098	1
Law	4,798,417	1	——	—	2,116,552	1
Library	38,387,338	8	37,888,762	11	21,190,210	5
Medical	38,387,338	8	4,939,743	1	132,159,143	29
Science	71,976,258	15	40,023,637	11	59,176,066	13
Service Facilities	19,193,669	4	8,708,798	2	10,157,206	2
Stadium-Gymnasium	28,790,503	6	32,774,841	9	32,816,176	7
Student Center	33,588,920	7	24,576,477	7	22,829,698	5
Vocational-Commercial	14,395,252	3	7,291,093	2	2,687,381	1
Multi-purpose and Misc.	4,798,417	1	66,688,548	18	9,282,020	2
ALL TYPES	$479,841,721	100	$360,601,252	100	$446,331,381	100

more facilities created by the increased number of births in the country, there is a constantly growing proportion of college age youth who are attending college.

The Task Ahead

All Americans are beginning to realize the enormity of the task confronting them in the effort to provide suitable school facilities for educating the young people of the nation. There have been notable attempts in various states to make an organized attack upon this problem. The machinery which has been set up to solve this problem in the various states has been successful in different degrees.

Right now, the nation is in the midst of a series of state conferences on education which are to culminate in a White House Conference on Education in Washington, D.C., in November. The state conferences are designed to marshal all of the available resources of each state in an effort to alleviate the critical situation facing our schools. A major topic at each meeting so far has been the schoolhousing shortage.

There is considerable agitation for some form of shared responsibility by the different levels of government. There are those who claim that the schoolhousing shortage, as well as all of the educational program, is a responsibility of state and local units. However, many communities and some states do not have the resources to provide defensible minimum standards.

The major problem confronted today is not one of resources. As stated by the National Citizens Commission for the Public Schools in a pamphlet, "Financing Education in the Decade Ahead":

> The financing problem is one of policy, not of resources; the problem is to select the best basis on which to make a small portion of the increased national production and income available for education.

As we concentrate our full talents upon devising the best method to make the funds available, we will continue to construct facilities at a rapid pace. We will provide even more new classrooms and other facilities during 1955. Our hope is that the quality and quantity of the new facilities will rise simultaneously.

The 107 entries in the 1954 Competition for Better School Design were judged by a panel of five members. From the left are: Kenneth Gibbons, AIA, Gibbons and Heidtmann, New York City, the professional adviser for the competition; and Willard S. Hahn, AIA, Wolf and Hahn, Allentown, Pennsylvania; R. Franklin Outcalt, AIA, Outcalt, Guenther & Associates, Cleveland, Ohio; Ward I. Miller, Superintendent of Schools, Wilmington, Delaware; Richard L. Howland, of the firm of Sibley, Sibley and Howland, West Hartford, Connecticut; and Walter Bogner, AIA, Harvard University Professor of Architecture, Cambridge, Massachusetts.



1954 COMPETITION FOR BETTER SCHOOL DESIGN

by GEORGETTE N. MANLA

Associate Editor, American School and University

IN THE Fourth Competition for Better School Design, sponsored by *The School Executive* magazine, 107 school buildings, constructed or under construction during 1954, were judged by a jury panel of five members. There were sixty-two elementary schools, thirty-three secondary schools, five combination buildings (grades 1 - 12), four college buildings and three special buildings included. The sole basis for judging was the excellence of a design as a solution to the particular problem involved.

Members of the Jury

The members of the jury panel were: R. Franklin Outcalt of the firm of Outcalt, Guenther and Associates, Cleveland, Ohio, chairman; Walter Bogner, Professor of Architecture, Harvard University; Willard S. Hahn, partner in the architectural firm of Wolf and Hahn, Allentown, Pennsylvania; Richard L. Howland of Sibley, Sibley and Howland, West Hartford, Connecticut; and Ward I. Miller, Superintendent of Schools in Wilmington, Delaware. Professional adviser of the competition was Kenneth Gibbons of the firm of Gibbons and Heidtmann, New York City.

The jury selected nine firms for honorable mention citations and two firms for special feature citations. Five top awards were presented for excellence in the design of two elementary schools, two secondary schools and one four-classroom transportable school.

What the Designs Revealed

It was felt by the jury of the competition that any outstanding innovations in school design were lacking. However, they believed that the designs presented were honest efforts to improve conceptions, refine earlier efforts and unify the quality of design throughout. They observed particularly that elementary schools show better planning than do secondary schools and colleges. The main design features of the elementary schools were not new, and secondary school designs proved to be better than anticipated.

Considerable effort seemed to be made to obtain economical school buildings. Some of the new construction materials used aroused speculation concerning their durability. Also, the jury questioned the ability of some of the new designs to be aesthetically pleasing over a period of many years. On the whole, the trend to use of the out-of-doors as an integral part of the school design was felt to be distinct but not altogether successful as yet.

Undoubtedly, the 107 school designs of the 1954 Competition for Better School Design have been influenced by past designs and will, themselves, influence school buildings of the future. In the following pages a review of these buildings is presented.



Jan Hankowski

The North Miami, Florida, Elementary School was constructed at a cost of $392,000. The building, completed in August, 1954, was designed by Wahl Snyder, architect of Miami, Florida.



There are four classrooms and one kindergarten in the Dan H. White School, Rio Vista, Solano County, California. Donald Beach Kirby and Associates, San Francisco, are the architects.

Wayne Wright



Rushton Elementary School in Johnson County, Kansas, contains 16,050 square feet of area. The building is located longitudinally along the crest of a hill. Donald R. Hollis of Overland Park is the architect.

Davisville Elementary School for the Town of North Kingstown, Rhode Island, houses grades one through six. The L-shaped building is the design of MacConnell and Walker of Apponaug, Rhode Island.

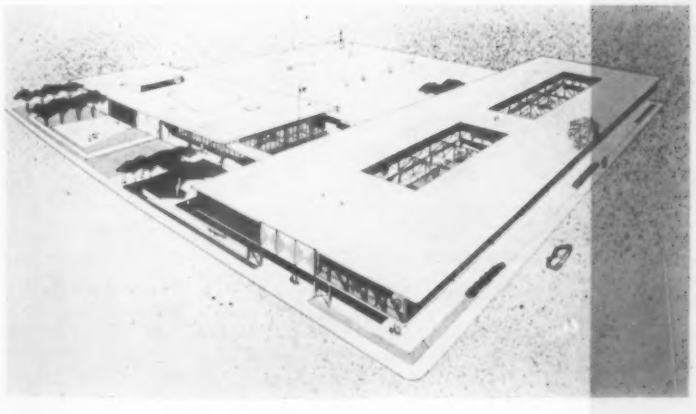




William Wollin

Middleton State Graded School in Middleton, Wisconsin, has a one story, heavy timber skeletal structural frame with prefabricated laminated columns. John J. Flad and Associates of Madison are the architects.

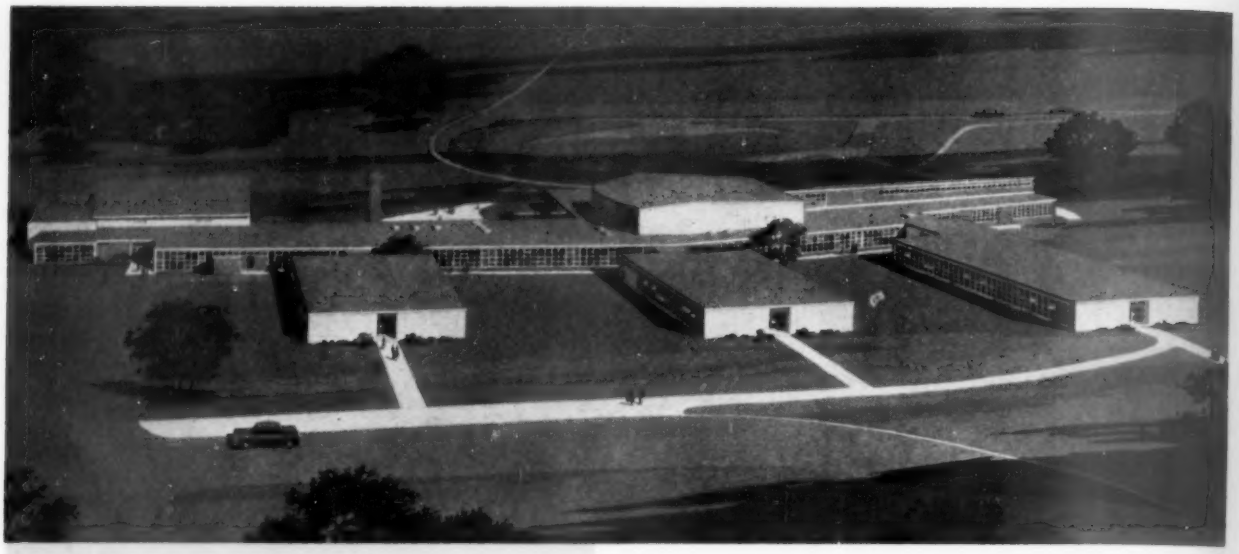
ELEMENTARY SCHOOL EXTERIORS



The structure of the Phillis Wheatley Elementary School in New Orleans, Louisiana, consists of twelve shop-fabricated trusses located in partitions between classrooms. Charles R. Colbert, New Orleans, is the architect-planner of the building.

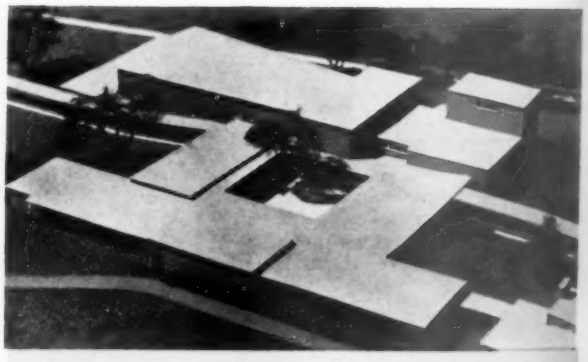
The Emerson School in Elmhurst, Illinois, has reinforced concrete columns, beams and slabs. Exterior walls are non-bearing. Architects of the building are Cone and Dornbusch of Chicago, Illinois.





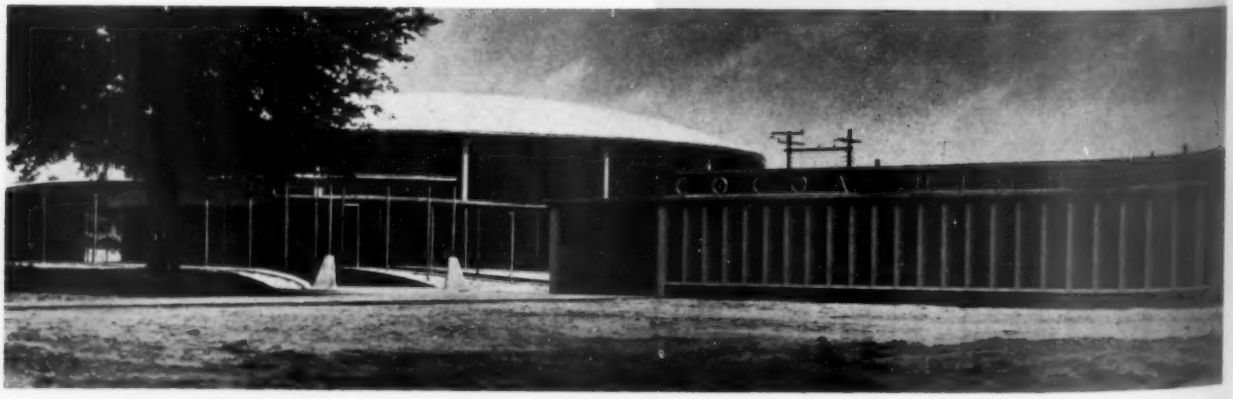
The Hudson Falls, New York, Junior-Senior High School is of fire resistive construction using steel frame and insulated roof deck. Sargent-Webster-Crenshaw and Folley of Syracuse, architects.

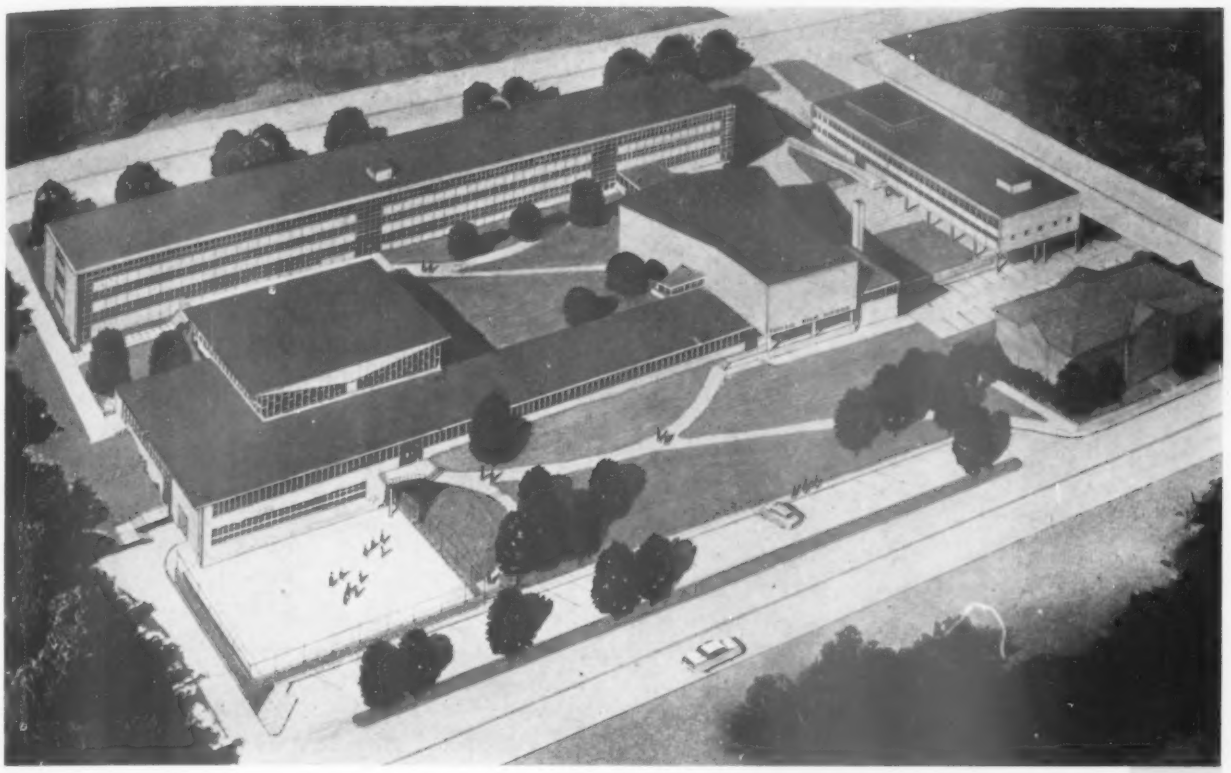
SECONDARY SCHOOL EXTERIORS



The Kirkwood, Missouri, Senior High School has a steel skeleton frame on poured piles with grade beams. The floor slab on earth has perimeter tunnels. William B. Ittner, Inc., St. Louis, Missouri, is the architect.

The high school for Cocoa, Florida, houses nine classrooms and many specialized departments. The circular auditorium has laminated wood arches. Architects of the building are Griffin and Gomon of Daytona Beach, Florida.





Both academic and vocational curriculums will be accommodated in the new Passaic Senior High School, Passaic, New Jersey. Kelly and Gruzen, architects of Newark, New Jersey, designed the building.

Gabriel Benzur

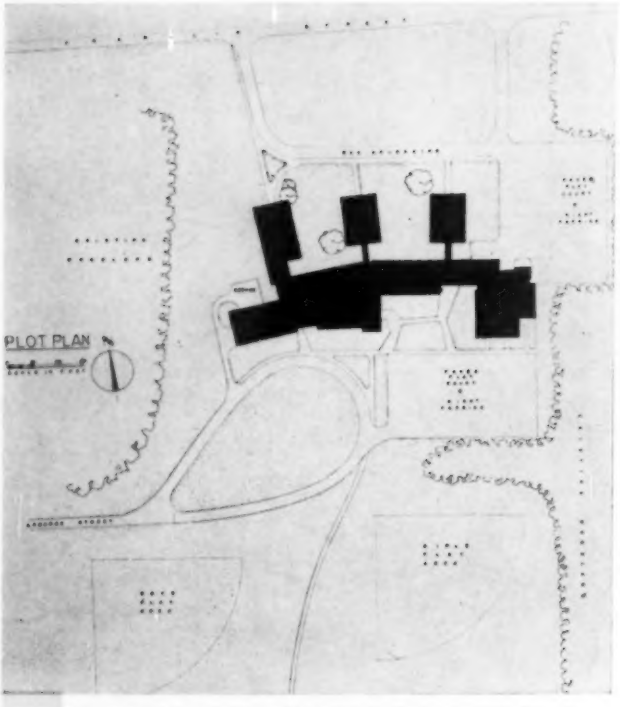


Covered walks surround a patio between the two elements of the Carver Heights High School in Columbus, Georgia. Aeck Associates of Atlanta are the architects.

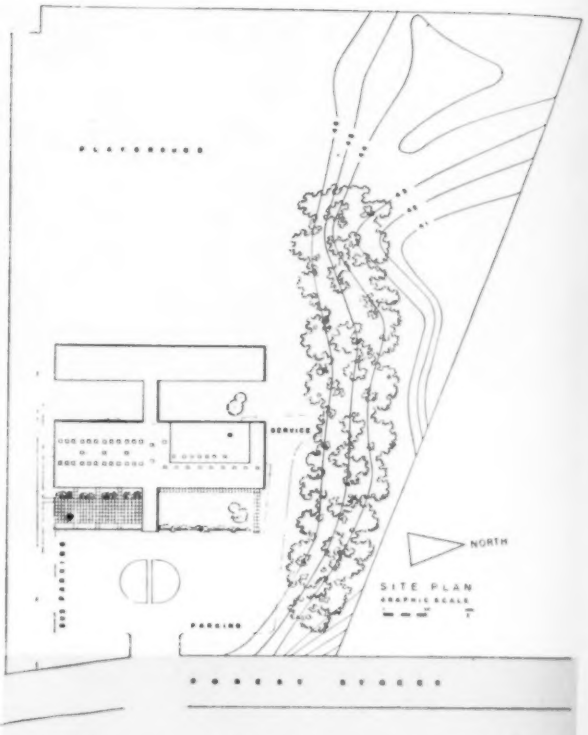
The Kennett, Missouri, High School is located on a site of 29.6 acres. The school, housing approximately 500 students, was designed by R. Paul Buchmueller of Sikeston, Missouri.

Dysart Studio





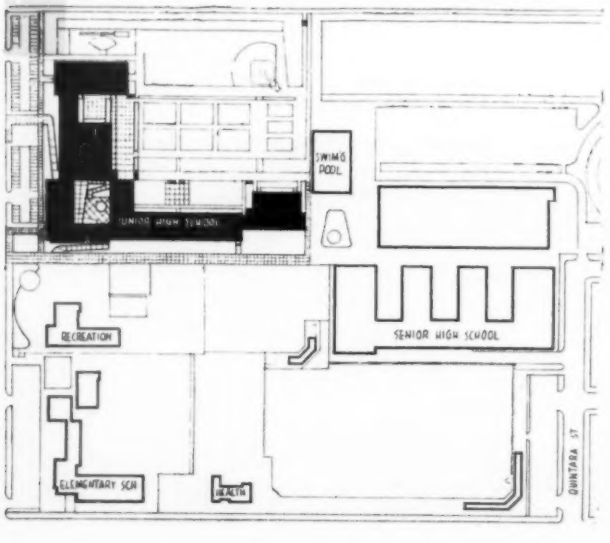
Open planning has provided a close-to-nature environment for the Hudson Falls, New York, Junior-Senior High School. Architects are Sargent-Webster-Crenshaw and Folley of Syracuse.



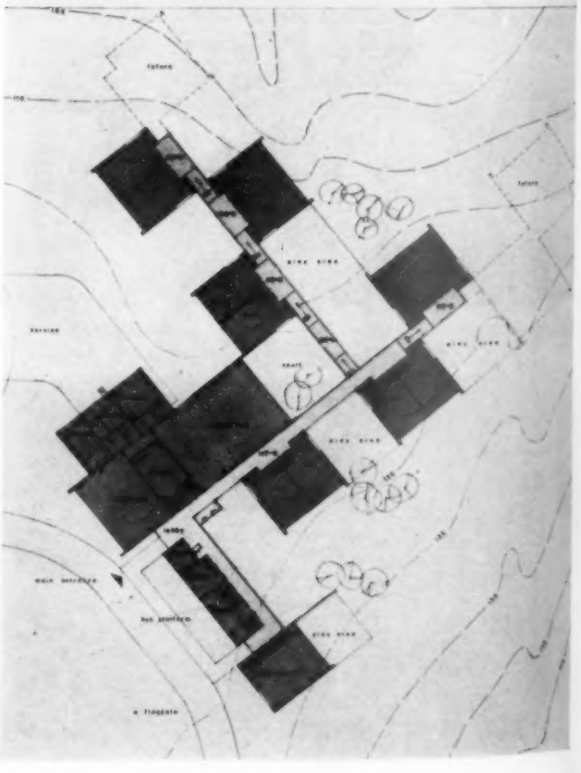
Trent Park Elementary School is located on a site adjacent to a residential development in New Bern, North Carolina. Burett H. Stephens and Robert H. Stephens, architects.

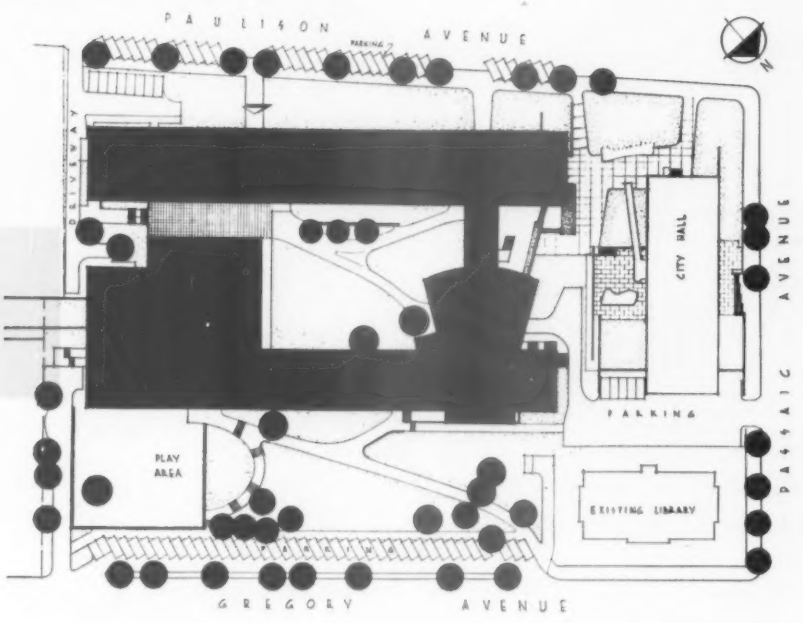
SITE PLOT PLANS

The A. P. Giannini Junior High School has a site of 7.5 acres at the Sunset Community Center in San Francisco. The architects are Harry A. Thomsen and Aleck L. Wilson.



A cluster scheme with two classrooms per cluster has adapted the Tower Street Elementary School, Westerly, Rhode Island, to an irregular site. Harriman, Willis and Hayden, Inc., Boston, are the architects.

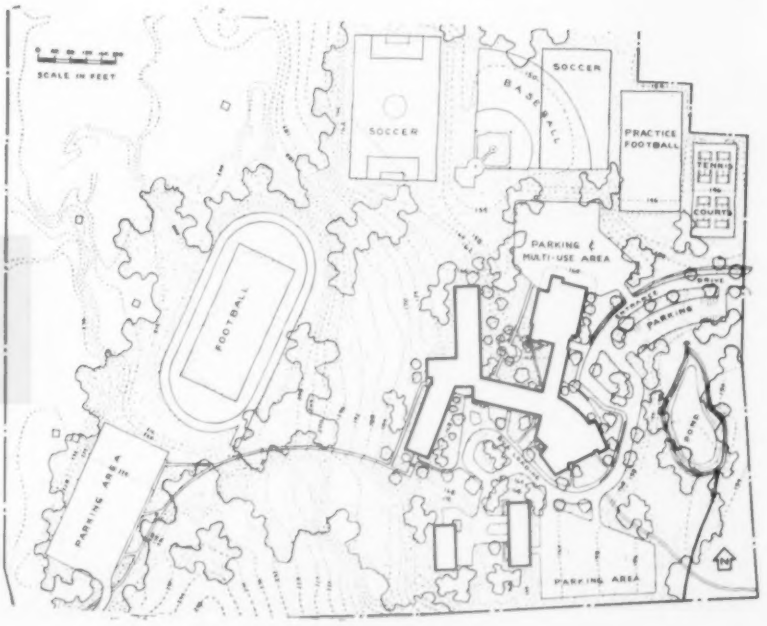




Passaic High School, Passaic, New Jersey, is on a steeply sloped four-acre city plot in a congested area. Kelly and Gruzen of Newark, architects.



A sheltered site of ten acres is the location of the Freshwater Elementary School in Humboldt County, California. Wm. M. Van Fleet of Eureka, California, is the architect.



Units are grouped compactly on the site of the West Springfield, Massachusetts, High School, Warren H. Ashley of West Hartford, Connecticut, architect.



Plastic skydomes in certain interior areas supplement the bilateral clerestory lighting of classrooms in the Hoover Elementary School, Neenah, Wisconsin. Perkins and Will, Chicago, are the architects.

Kranzten

CLASSROOMS

Classrooms in the South Elementary School, Nappanee, Indiana, have a large amount of tackboard, chalkboard and a work counter along one full wall. The architect of the building is Alves D. O'Keefe of Plymouth, Indiana.

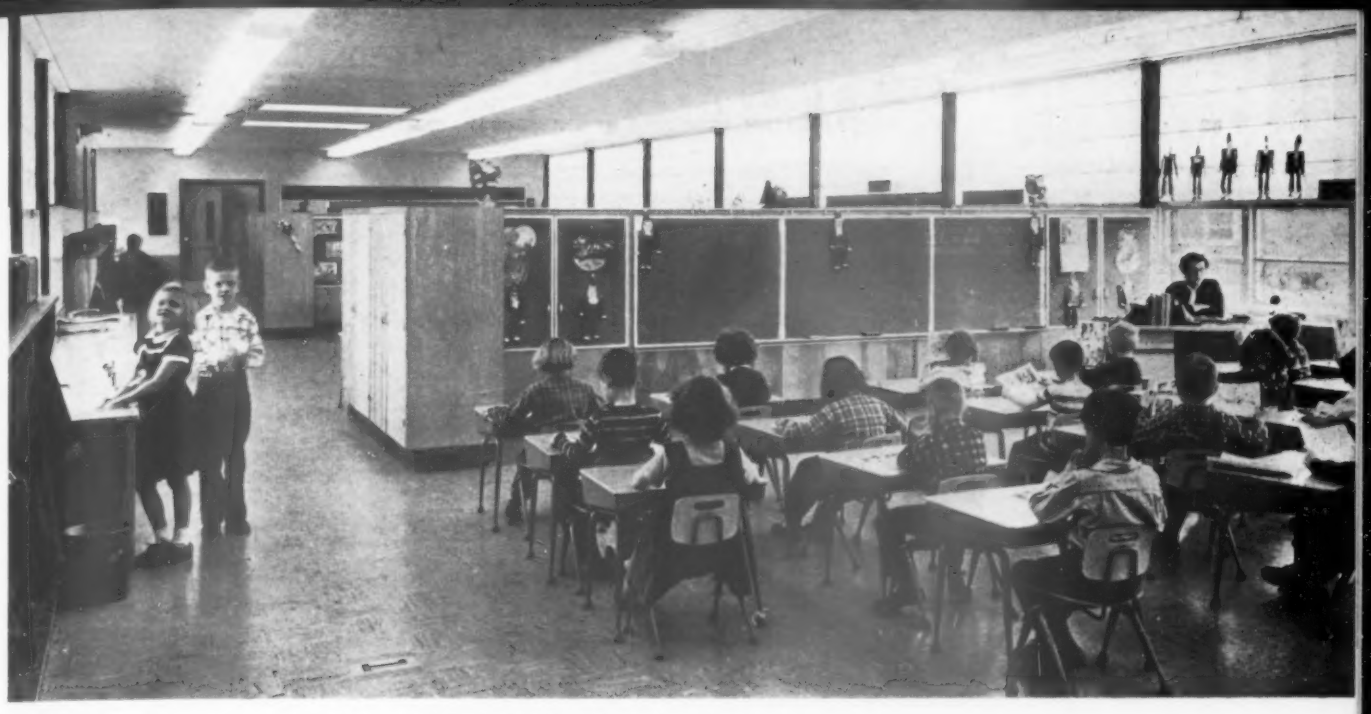


Hart Studio

Ken Smith



Each classroom in the Highland Elementary School, Lower Allen Township, Cumberland County, Pennsylvania, has maximum daylighting through the use of glass block and vision strips and a pattern of plastic skydomes. The school was designed by the firm of Edmund Geo. Good, Jr., Harrisburg.



The open instruction areas of the North Elementary School, Chelsea, Michigan, are a different approach to classroom design. Louis C. Kingscott & Assoc., Inc., architects.

Ken Smith



There are eighteen regular classrooms in the Cumberland Valley Joint High School for Silver Spring Township, Cumberland County, Pennsylvania. Edmund Geo. Good, Jr. is the architect.



Classrooms in the Marcus, Iowa, Elementary School are arranged in a line with a single corridor leading to all rooms. The architects are Smith, Voorhees, Jensen, Silletto and Associates of Des Moines, Iowa.



Suter, Hedrich-Blessing

Classroom partitions in the Schaumburg, Illinois, Elementary School stop short of the ceilings. Clear glass is set in some of these open spaces. The architects are Schweikher and Elting of Chicago, Illinois.



Paul R. Balla

There are thirteen classrooms in the Lincoln Elementary School, El Dorado, Kansas. Leaper and Gilbert of Wichita are the architects of the building.

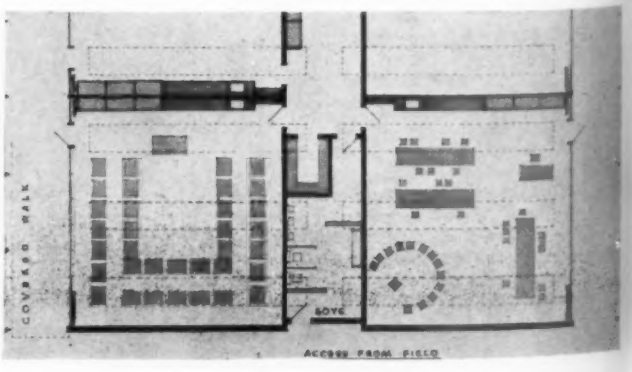
CLASSROOMS

There are eight classroom units, containing two classrooms each, in the Hollow Tree Elementary School, Darien, Connecticut. Ketchum, Giná and Sharp, New York City, architects.



Ezra Stoller

There is complete flexibility of furniture arrangement in classrooms of the Kenmore, Washington, Elementary School. The architect is Ralph Burkhard of Seattle, Washington.





The kindergarten in the Hoover School, Neenah, Wisconsin, has its own toilet facilities and outside entry. Perkins and Will, Chicago, Illinois, architects-engineers.

Kranzten Studio



Kindergarten children of the North Elementary School, Cedar City, Utah, attend classes on a half-day schedule. The building was designed by L. Robert Gardner.

KINDERGARTENS

There are 1,050 square feet of area in the kindergarten of the South Elementary School, Nappanee, Indiana, Alves D. O'Keefe, architect. A small platform stage is for playlets and is also used at PTA meetings.



Hart Studio

Separated by brick walls, each classroom of the Rushton Elementary School, Johnson County, Kansas, has its own corridor activity area. Donald R. Hollis of Overland Park is the architect.



Wayne Wright



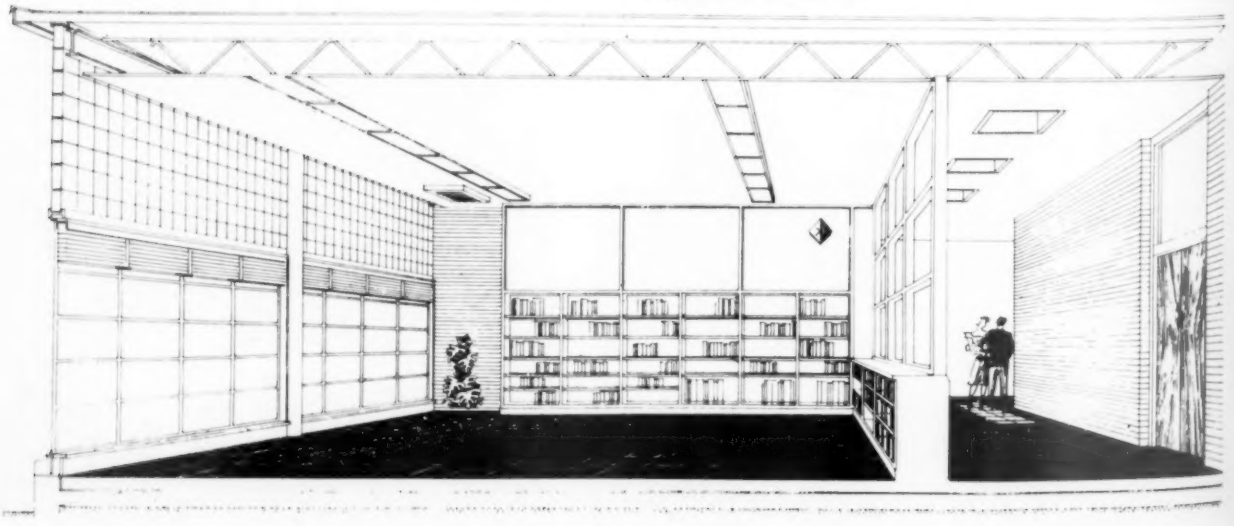
Built-in cabinets and storage drawers supplement the wooden shelving in the library of the Jefferson Elementary School in Manistee, Michigan. The architectural firm is Louis C. Kingscott and Associates, Inc. of Kalamazoo, Michigan.

Stairs at the far end of the library in Saint Patrick's High School, Halifax, Nova Scotia, lead to a reading area in the mezzanine. Downie, Baker and Ahern, architects.



LIBRARIES

A glass partition divides the library and corridor in the Trent Park Elementary School, New Bern, North Carolina. The architects are Burett H. Stephens and Robert H. Stephens of New Bern.





There is natural lighting through skydomes in the library of the Arthur Smith Elementary School in Grandview, Washington. John S. Villesvik of Yakima, Washington, is the architect of the building.

Roger Sturtevant



Book stacks divide reading areas in the library of the East Hartford High School, East Hartford, Connecticut. Nichols and Butterfield of West Hartford are the architects, together with Perkins and Will of Chicago, Illinois.



Double doors lead from the outdoors to the library in the Belshaw School, Antioch, California. Wurster, Bernardi and Emmons, San Francisco, are the architects.

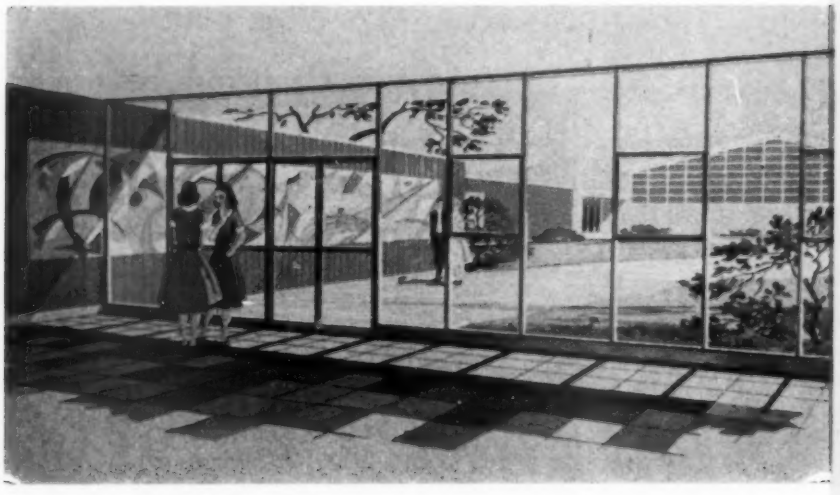


The library of the Bessemer Junior High School, Bessemer, Alabama, is located for isolation and quiet. The architect is Wilmot C. Douglas of Birmingham.



Face brick, used on the exterior walls, extends into the main lobby of the Lowden Elementary School, South Euclid, Ohio. The architects are Spahn and Barnes of Cleveland Heights.

FOYERS LOBBIES



The out-of-doors is brought close through the window wall of the auditorium lobby in the Hudson Falls, New York, Junior-Senior High School. Sargent-Webster-Crenshaw and Folley, architects.

Fred Stone



The entrance lobby of the James L. Mulcahey School in Taunton, Massachusetts, has a large panel of glazed tiles made by the children. School is by The Architects Collaborative, Cambridge.



Comfortable chairs occupy a corner of the foyer in the Emerson School, Elmhurst, Illinois. Cone and Dornbusch of Chicago, architects.

Kranzten



Two-way mailboxes for teachers in the Hoover School, Neenah, Wisconsin, float in glass. Perkins and Will of Chicago, architects-engineers.

Kranzten



The windowed office area in the Blackhawk Elementary School, Park Forest, Illinois, is inviting to children and visitors. Perkins and Will, architects.

ADMINISTRATIVE

Bishop & Scott



Skylights over the desks provide natural lighting in the administrative area of the Natick, Massachusetts, Senior High School. The school was designed by Shepley, Bulfinch, Richardson & Abbott and Smith and Sellew of Boston.



This office area is in the Cumberland Valley Joint High School, Silver Spring Township, Cumberland County, Pennsylvania. The architect is Edmund Geo. Good, Jr. of Harrisburg.

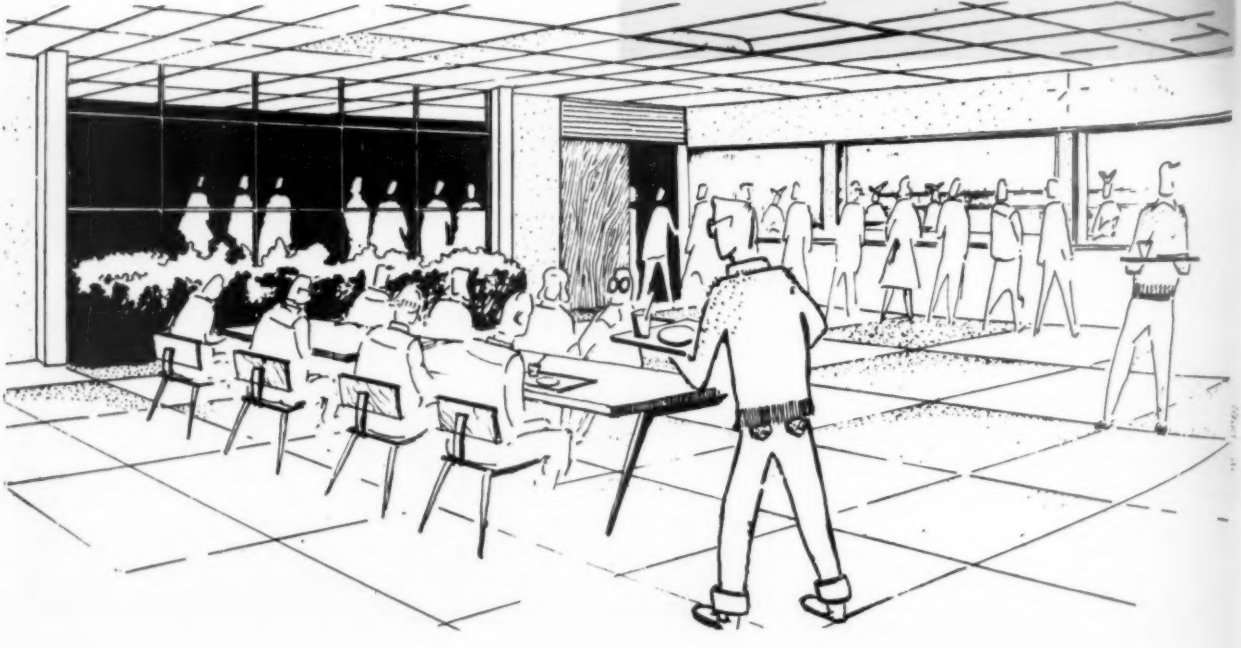
Ken Smith

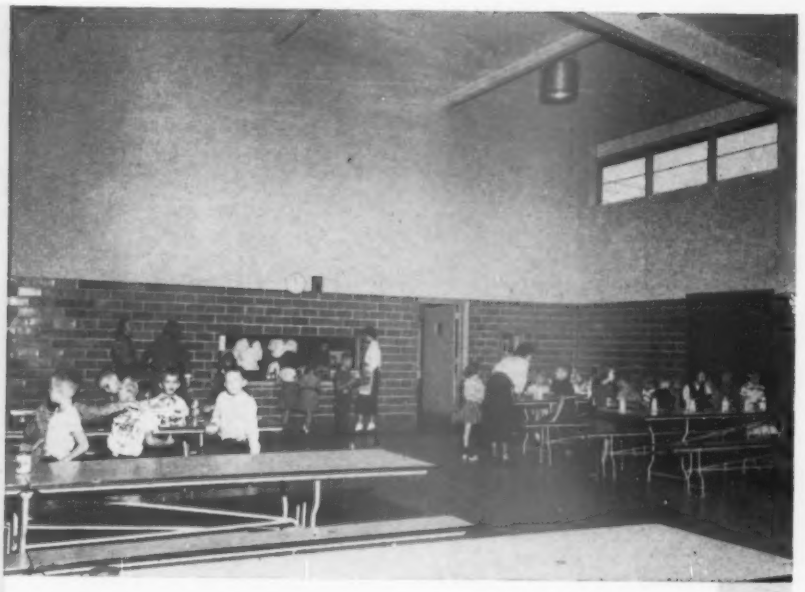


Built-in folding tables and benches turn the multi-purpose unit of the Royal Oaks Elementary School, Duarte, California, into a cafeteria. Maynard Lyndon of Los Angeles, architect.

LUNCHROOMS

The cafeteria of the Hicksville, New York, High School is sized to permit the addition of 25 classrooms planned for future expansion. Knappe and Johnson of New York City are the architects.



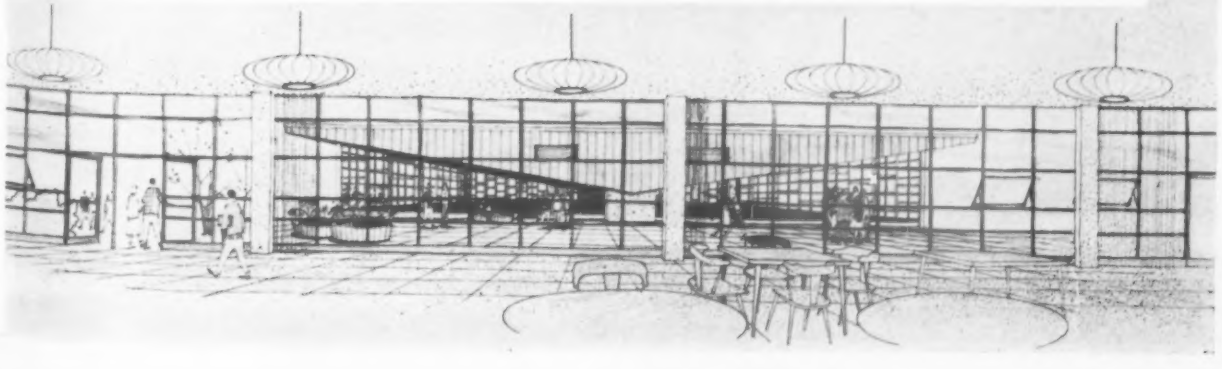


Lunch is served on folding tables in the multi-use room of the Marcus, Iowa, Elementary School. Architects are Smith, Voorhees, Jensen, Silletto and Associates of Des Moines.



It's time for lunch in the combination cafeteria-auditorium of the Davisville School in North Kingstown, Rhode Island. MacConnell and Walker of Apponaug, Rhode Island, architects.

A terrace separates the gymnasium and cafeteria of the Passaic High School in Passaic, New Jersey. The school, designed for 1,200 to 1,450 students, is by Kelly and Gruzen of Newark, New Jersey.





Kranzten

The all-purpose room of the Hoover School, Neenah, Wisconsin, doubles as a library. Perkins and Will are the architects-engineers.

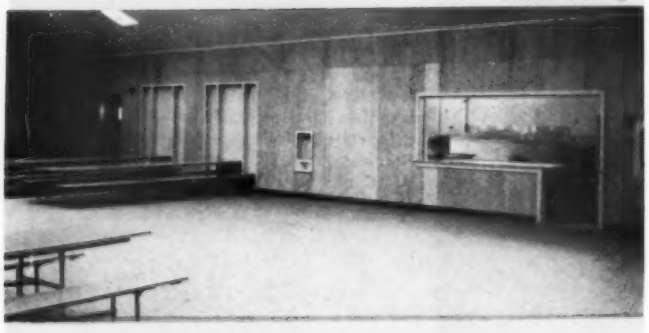
In-wall tables and chairs accommodate children at lunch hour in the auditorium-lunchroom of the Paramount Park Elementary School, Shoreline School District, King County, Washington. Young, Richardson, Carleton & Detlie of Seattle, architects.

MULTI-PURPOSE UNITS



Chas. B. Pe

Robert Loranger

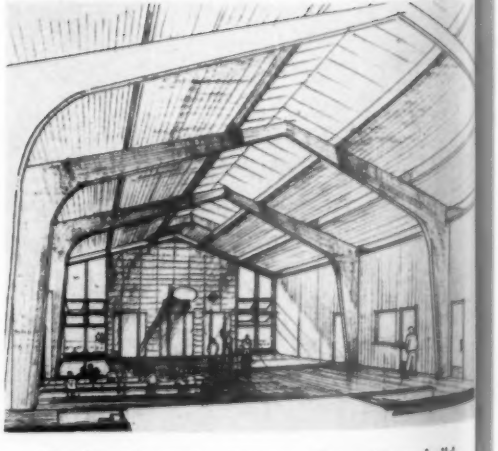


The multi-purpose unit of the West Davis Elementary School in Davis, California, was designed to the scale of the children using it. Barovetto and Thomas of Sacramento, architects.

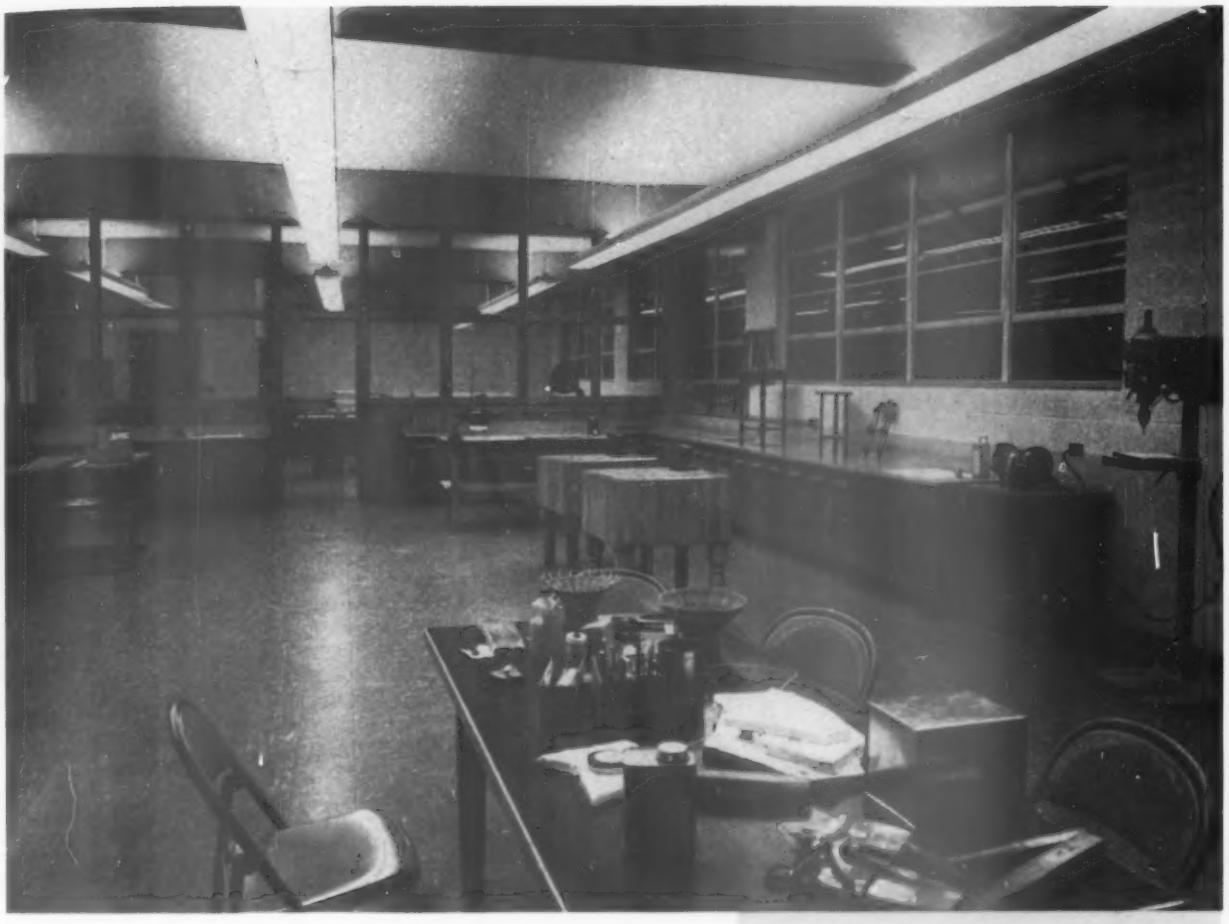
The cafeterium in the North Miami Elementary School, North Miami, Florida, is a combination auditorium-lunchroom. The architect is Wahl Snyder of Miami, Florida.



Hankowsky



Laminated wood arches span the multi-use building of the Freshwater Elementary School, Humboldt County, California. Wm. M. Van Fleet is the architect.



Several crafts and arts may be taught to small groups by one or two teachers without confusion in the arts and crafts room of the Bessemer, Alabama, Junior High School. Wilmot C. Douglas, Birmingham, is the architect.

ARTS AND CRAFTS

Ken Smith



An important auxiliary area in the Cumberland Valley Joint High School, Cumberland County, Pennsylvania, is this large arts and crafts room. The architect is Edmund Geo. Good, Jr. of Harrisburg.



Ken Smith

The agriculture classroom of the Cumberland Valley Joint High School, Cumberland County, Pennsylvania, is separated from the shop by a glass partition. Edmund Geo. Good, Jr., architect.

AGRICULTURE

There is plenty of room for large farm machinery and equipment in the farm shop of the Robert E. Lee High School Shop Building, Baytown, Texas. Lowell Lammers is the architect.

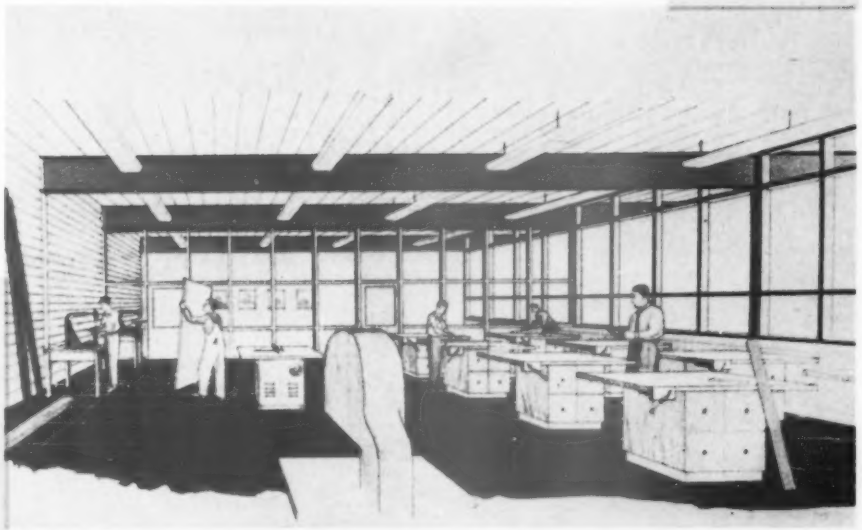






The graphic arts shop (left) and mechanical drawing room (right) of the East Hartford, Connecticut, High School are located in the shop unit of the school. The architects are Nichols and Butterfield of West Hartford and Perkins and Will of Chicago.

SCHOOL SHOPS



The wood shop of the Lutheran High School, Wauwatosa, Wisconsin, is one of three manual training shops in the school. The architects of the building are Grassold-Johnson & Associates, Milwaukee.



Large glass areas give visual cohesion to the shops and classrooms of the Robert E. Lee High School Shop Building in Baytown, Texas. The architect is Lowell Lammers.



Julius Shulman

The band room of the Chemawa Junior High School in Riverside, California, is part of a modern music department to encourage the development of music in the educational program. Herman O. Ruhnau is the architect.

Ken Smith



MUSIC

A distinctive wall arrangement with concrete block is achieved in the music room of the Cumberland Valley Joint High School, Cumberland County, Pennsylvania. Edmund Geo. Good, Jr., architect.

The band department of the Texarkana, Arkansas, High School is located near the athletic field and future auditorium. Reinheimer and Cox of Texarkana, Texas, are the architects.



The Cocoa, Florida, High School band room has attendant practice rooms. The architects of the school are Griffin and Gomon of Daytona Beach, Florida.

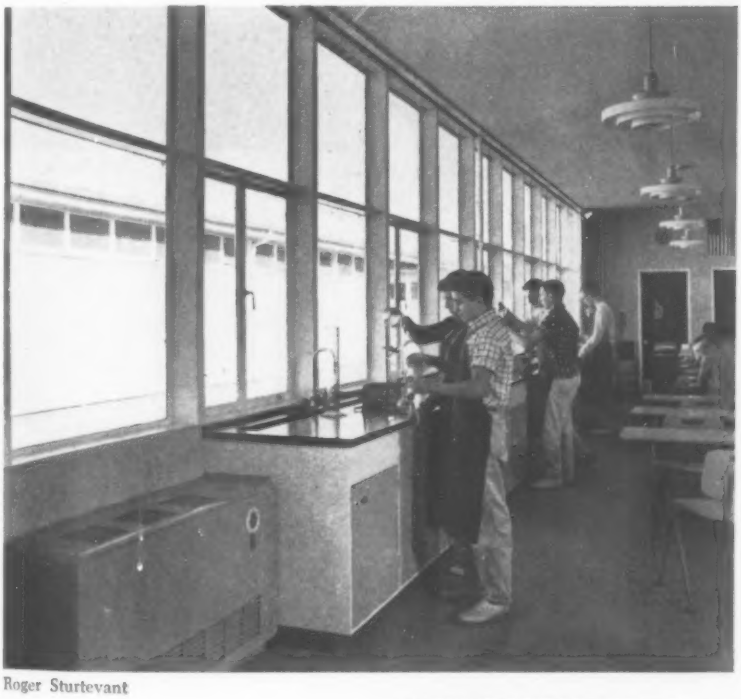


There are work tables at the side and rear of the science room in the Cumberland Valley Joint High School, Cumberland County, Pennsylvania. Edmund Geo. Good, Jr., architect.



Ken Smith

SCIENCE



Roger Sturtevant

Specialized apparatus space is located along lateral walls in the science unit of the Healdsburg, California, High School. The architects are Falk and Booth of San Francisco.

Bollinger

The biology laboratory of Saint Patrick's High School in Halifax, Nova Scotia, has built-in display cases and cabinets. Downie, Baker and Ahern are the architects.



HOMEMAKING



Ken Smith Photos

The art of homemaking is taught to students of the Cumberland Valley Joint High School in Cumberland County, Pennsylvania, in this combination homemaking and sewing room. An adjoining suite is provided for home management students. This consists of a home-like kitchen and dining room with a nearby living room.





The living room of the home management suite in the Cumberland Valley Joint High School features a fireplace and comfortable furniture. The school is designed by Edmund Geo. Good, Jr., of Harrisburg, Pennsylvania.



Bollinger Photos

The household arts department of Saint Patrick's High School, Halifax, Nova Scotia, consists of a room for cooking and serving food and a sewing room. The architects of the building are Downie, Baker and Ahern of Halifax.





The building structure and homemaking activities are integrated in the home economics room of the Blackhawk School, Park Forest, Illinois. Perkins and Will, Chicago, architects.

Kranzten

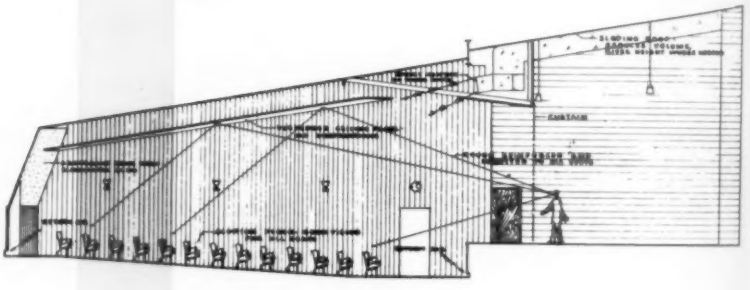


Charthe Studio

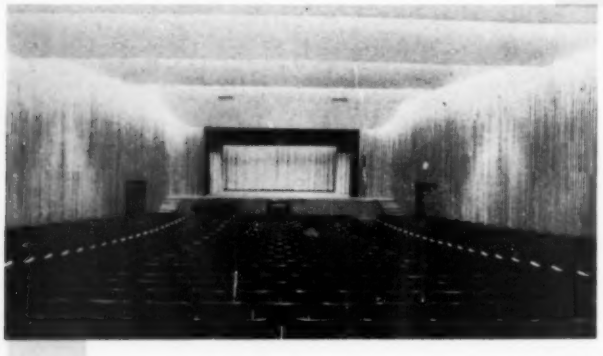
The circular auditorium of the Cocoa, Florida, High School has a center arch ring. The design provides excellent viewing and audio reception from all areas of the auditorium. Griffin and Gomon of Daytona Beach are the architects.

Vertical redwood paneling is used in the auditorium of the Junior-Senior High School, Edgemont School District, Westchester County, New York, to create warmth and texture for the large vertical surfaces. Warren H. Ashley of West Hartford, Connecticut, is the architect.

AUDITORIUMS

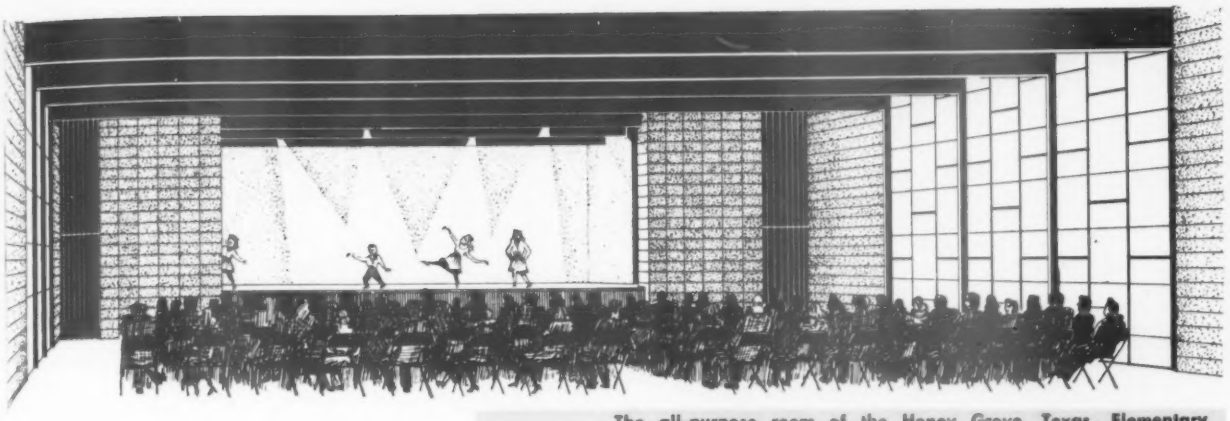


There is seating for 1,200 persons in the auditorium of the East Hartford, Connecticut, High School. The architects are Nichols and Butterfield, West Hartford, and Perkins and Will of Chicago, Illinois.





Chair storage for the auditorium in the multi-use unit of the Royal Oaks Elementary School in Duarte, California, is provided underneath the stage platform. Maynard Lyndon of Los Angeles is the architect of the building.



The all-purpose room of the Honey Grove, Texas, Elementary School serves the functions of an auditorium. Stanley Brown of Dallas is the architect.

Bollinger



The auditorium of Saint Patrick's High School in Halifax, Nova Scotia, has a seating capacity of 1,028 persons. Downie, Baker and Ahern are the architects.

Approximately 1,000 people can be seated in the auditorium of the Cumberland Valley Joint High School, Cumberland County, Pennsylvania. At the right is shown the stage control panel. Edmund Geo. Good, Jr., is the architect of the high school.





Ken Smith Photos

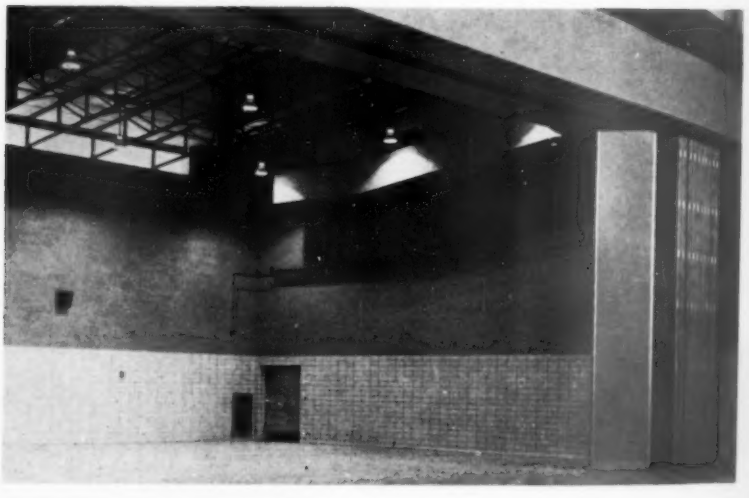


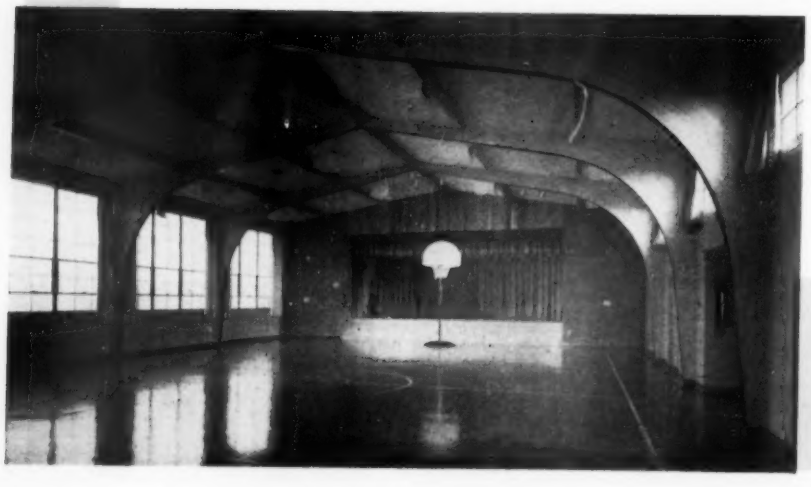
Art Hupy

The multi-purpose room of the Lakeview School, Mercer Island, Washington is used for physical education classes and can accommodate a small basketball game. Architects are Bassetti, Morse and Aitken, Seattle.

PHYSICAL EDUCATION

A folding partition divides the gymnasium of the May Goodrell Junior High School, Des Moines, Iowa. Wetherell and Harrison are the architects.





Physical education classes are held in the multi-use room of the Arthur H. Smith School, Grandview, Washington. The architect is John S. Villesvik of Yakima, Washington.



Twe separate classes can use the gymnasium floor of the Cocoa, Florida, High School at one time. The playing floor measures 100 feet by 100 feet. The architects are Griffin and Gomon of Daytona Beach.

Charthe

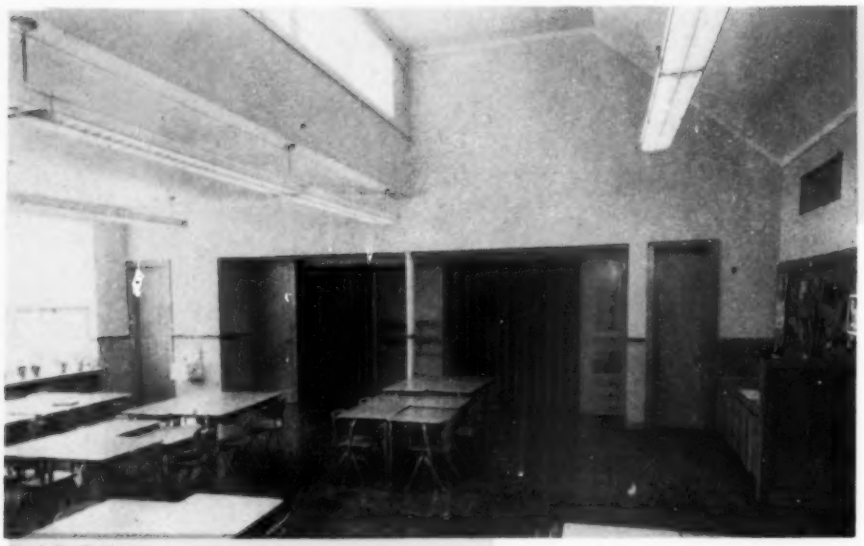


Full length lockers for an entire athletic squad are provided in the locker room of the new Field House for Westboro, Massachusetts. The building was designed by Wm. Nelson Jacobs Associates of Boston, Massachusetts.

Robert Lackenbach



The new Boys' Gymnasium of the Liberty Union High School, Brentwood, California, has a main playing floor, special exercise room, locker area, classroom and coaches' office. Yeung and Lloyd of Albany, California, designed the building.



Paul R. Bulla

In the Lincoln Elementary School, El Dorado, Kansas, classrooms have light deflecting glass block over ribbon windows. There is also a glass block clerestory. Leaper and Gilbert of Wichita are the architects.

LIGHTING

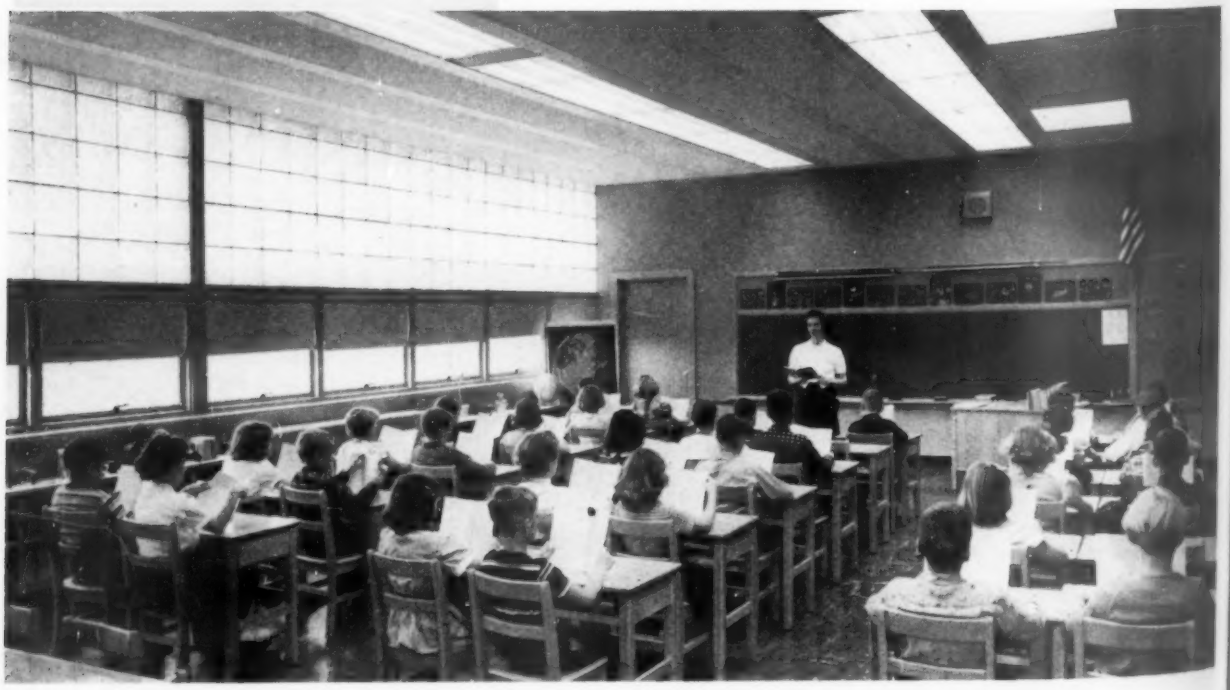
Ezra Stoller



A window wall provides daylight, combining with fluorescent fixtures to illuminate classrooms in the Hollow Tree School, Darien, Connecticut. Ketchum, Giná and Sharp, New York City, are the architects.

Daylight enters classrooms of the Highland Elementary School in Highland Park, Pennsylvania, through glass blocks, a vision strip and plastic skydomes. Edmund Geo. Good, Jr., architect.

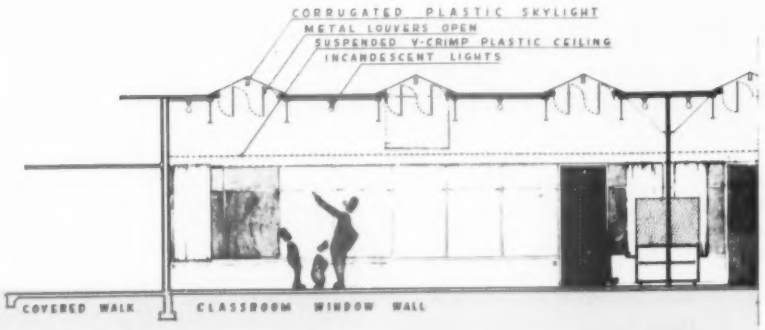
Ken Smith





Pirkle Jones

An overall, luminous ceiling of plastic provides illumination for rooms in the Dan H. White School, Rio Vista, California. The architect is Donald Beach Kirby and Associates, San Francisco.



The lighting system in classrooms of the Kenmore, Washington, Elementary School consists of a corrugated plastic skylight with metal louvers over a suspended plastic crimp ceiling. There are also incandescent lights. The architect is Ralph Burkhard of Seattle.

Combined lighting of roof clerestories and fluorescent fixtures illuminates rooms in the Belshaw School, Antioch, California. Wurster, Bernardi and Emmons, architects.



Roger Sturtevant

Incandescent concentric ring fixtures and skydomes provide lighting in the Arthur H. Smith School, Grandview, Washington. John S. Villesvik, architect.





Wayne Wright

Activity areas in the corridor of the Rushton Elementary School, Mission, Kansas, also serve as dining rooms during the lunch hour. Donald R. Hollis of Overland Park is the architect.



The continuous corridor skylight provides bilateral lighting for classrooms in the Oaklawn School, Oshkosh, Wisconsin. Auler Dreger Wiley & Wertsch, Inc. are the architects.

Dearborn-Masse

INDOOR CORRIDORS

A single-loaded corridor connects classrooms in the Middleton State Graded School, Middleton, Wisconsin. John J. Flad and Associates of Madison are the architects.



William Wollin

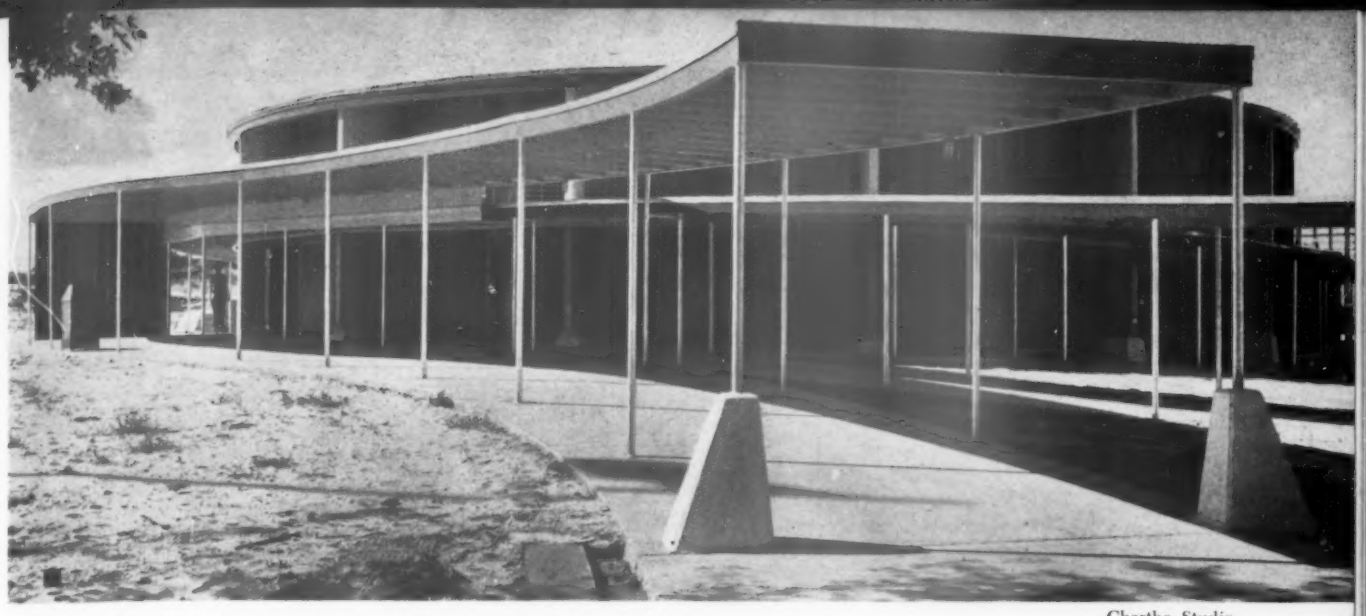


The double-loaded corridor of the Sherman Elementary School in Tacoma, Washington, has a skylight to provide bilateral light to classrooms. The architect is Robert Billsbrough Price of Tacoma.

S. T. Lo



A skylight illuminates the corridor and provides secondary natural light for classrooms in the Country School, Weston, Massachusetts. Hugh Stubbins Associates, architects.



Charthe Studio

Connecting open corridors lead to the separate classroom wings of the Cocoa, Florida, High School. The architects are Griffin and Gomon, Daytona Beach.

Zintgraff



OUTDOOR CORRIDORS

Covered passages, also serving as sheltered walks, connect units of the San Marcos, Texas, Junior High School. The building is designed on the campus style by Harvey P. Smith and Associates of San Antonio.

A wide roof overhang provides a sheltered walkway for students of the Lizzie M. Burgess Elementary School in Sequin, Texas, designed by Fehr and Granger of Austin.

A graceful extension of the roof line provides an outdoor corridor and porch for the Transportable Four-Classroom Elementary School designed for the Dearborn, Michigan, public schools by Eberle M. Smith Associates, Inc. of Detroit.



Mears



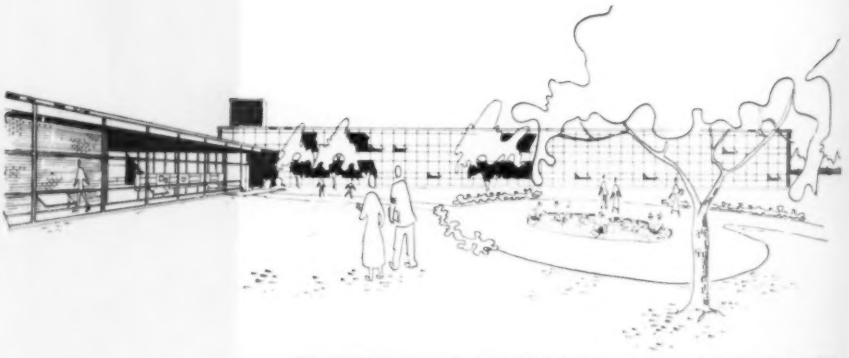
Lens Art



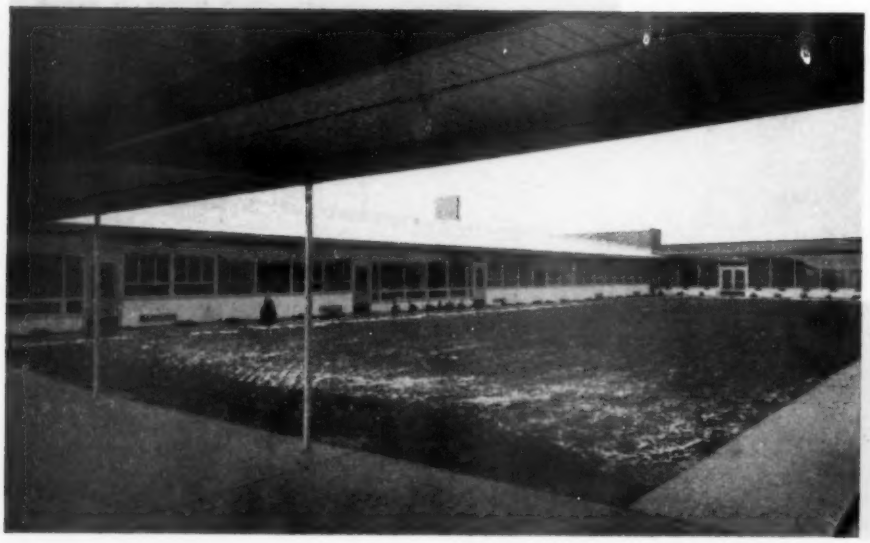
The covered outdoor play area of the Sherman Elementary School, Tacoma, Washington, is directly accessible to an indoor play area. Robert Billsbrough Price, architect.

Dearborn-Massar

OUTDOOR AREAS



An outdoor court is included in the overall plan of the Junior-Senior High School, Edgemont School District, Westchester County, New York. The architect is Warren H. Ashley of Connecticut.



A sheltered court is formed between the two classroom wings of the Arthur H. Smith School in Grandview, Washington. The architect of the building is John S. Villesvik of Yakima, Washington.



A pleasing outdoor atmosphere for children is created by the covered walkways of the Royal Oaks Elementary School, Duarte, California, designed by Maynard Lyndon.

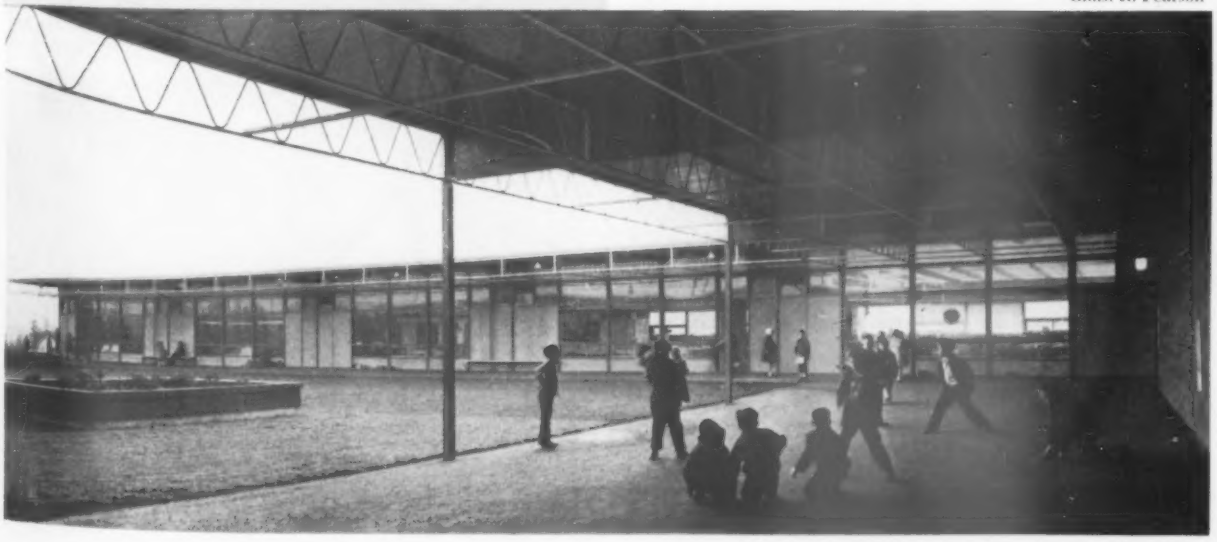
Roger Sturtevant

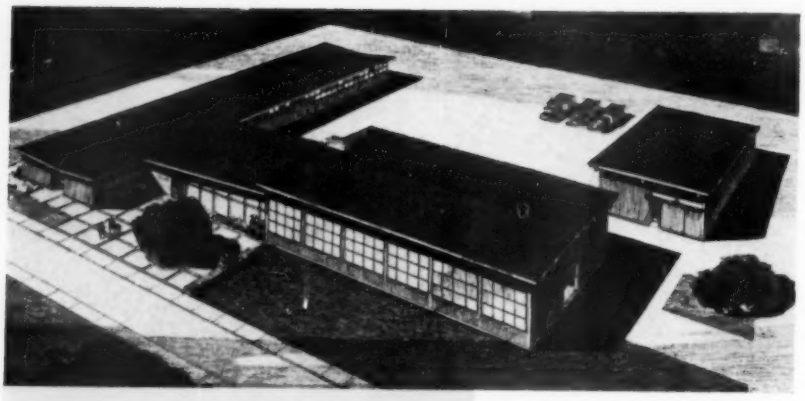


Outside exits lead to classrooms from the play court of the Belshaw School in Antioch, California. Wurster, Bernardi and Emmons of San Francisco, are the architects.

A covered exterior play court is located near classrooms in the Paramount Park Elementary School, King County, Washington. Young, Richardson, Carleton and Detlie of Seattle are the architects.

Chas. R. Pearson





The Forest Products Laboratory for the University of California at Richmond was designed to demonstrate the direct use of wood relative to structural, aesthetic, maintenance and cost values. The architects are Harry A. Thomsen and Aleck L. Wilson of San Francisco.

COLLEGE BUILDINGS

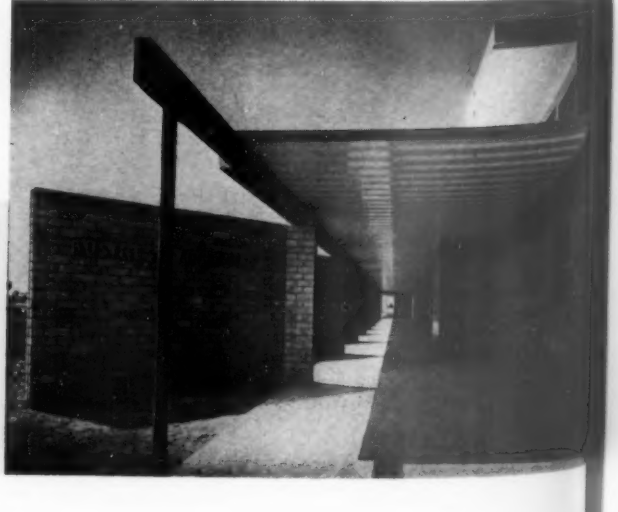


Total contract construction cost for the College of Law Building at the University of Illinois in Champaign is $1,497,500. The architects are Ambrose M. Richardson and Ernest L. Stouffer of the University staff.



One of the special areas in the Physical Education and Activities Building at the College of Saint Elizabeth, Convent Station, New Jersey, is this spacious students' lounge. The architects of the building are Ferrenz and Taylor of New York City.

The Business Education Building for Orange Coast College in Costa Mesa, California, contains eight instructional rooms and has a capacity of 250 students. The architects are Richard J. Neutra and Robert E. Alexander of Los Angeles, California.



PARTICIPANTS IN THE 1954 COMPETITION

● TOP AWARDS
■ HONORABLE MENTIONS
◆ SPECIAL FEATURES

AECK ASSOCIATES, Atlanta, Georgia
Carver Heights High School, Columbus, Georgia

THE ARCHITECTS COLLABORATIVE, Cambridge, Massachusetts
◆ James L. Mulcahey School, Taunton, Massachusetts
South Attleboro Junior High School, South Attleboro Massachusetts

WARREN H. ASHLEY, West Hartford, Connecticut
Junior-Senior High School—Edgemont School District, Westchester County, New York
Senior High School, West Springfield, Massachusetts

AULER DREGER WILEY & WERTSCH, INC., Oshkosh, Wisconsin
Oaklawn Elementary School, Oshkosh, Wisconsin

JOSEPH BAKER & ASSOCIATES, Newark, Ohio
Fulton Elementary School, Heath Village, Ohio
Tallmadge Elementary School, Lancaster, Ohio

BAROVETTO & THOMAS, Sacramento, California
Roberts Elementary School, Orangevale, California
West Davis Elementary School, Davis, California

BASSETTI, MORSE & AITKEN, Seattle, Washington
■ Lakeview Elementary School, Mercer Island, Washington

CHARLES A. BAYLON & ASSOCIATES, Aberdeen, Washington
Lake Quinault School (12 year), Amanda Park, Washington

BEARDSLEY & BEARDSLEY, Auburn, New York
Skaneateles Elementary School, Skaneateles, New York

BENEDICT, RYAN & SAYER, Plattsburg, New York
West Street Elementary School, Malone, New York

HENRY L. BLATNER, Albany, New York
Dix Avenue Elementary School, Hudson Falls, New York

J. M. BLEW AND SON, Media, Pennsylvania
Elementary School, Chester, Pennsylvania

STANLEY BROWN, Dallas, Texas
Daingerfield, Texas, Junior-Senior High School
Honey Grove, Texas, Elementary School

R. PAUL BUCHMUELLER, Sikeston, Missouri
Lee Hunter Elementary School, Sikeston, Missouri
Kennett High School, Kennett, Missouri

RALPH H. BURKHARD, Seattle, Washington
Kenmore Elementary School, Kenmore, Washington

CHARLES R. COLBERT, New Orleans
● Phillis Wheatley Elementary School, New Orleans

CONE & DORNBUSCH, Chicago, Illinois
Emerson Elementary School, Elmhurst, Illinois

CUSHING & TERRELL, Billings, Montana
Helena Senior High School, Helena, Montana

DONALDSON & MEIER, JOHN E. CLAPP & WM. H. CREASER, Detroit, Michigan
Samuel Gompers Elementary School, Detroit

DONNELLY & WHITTET, Corpus Christi, Texas
Prescott Elementary School, Corpus Christi, Texas

WILMOT C. DOUGLAS, Birmingham, Alabama
Bessemer Junior High School, Bessemer, Alabama

DOWNIE, BAKER & AHERN, Halifax, Nova Scotia
St. Patrick's High School, Halifax, Nova Scotia

FALK & BOOTH, San Francisco, California
West Hillsborough Elementary School, Hillsborough, California
Healdsburg High School, Healdsburg, California

FEHR & GRANGER, Austin, Texas
Lizzie M. Burgess Elementary School, Seguin, Texas

FERRENZ & TAYLOR, New York City
St. Vincent Ferrer School (12 year), New York City
Physical Education and Activities Building, College of St. Elizabeth, Convent Station, New Jersey

JOHN J. FLAD & ASSOCIATES, Madison, Wisconsin
■ Middleton, Wisconsin, State Graded School

FLEWELLING & MOODY, Los Angeles
Del Norte Elementary School, West Covina, California

JAMES C. GARDINER, Portland, Oregon
Fir Grove Elementary School, Beaverton, Oregon

L. ROBERT GARDNER, Cedar City, Utah
Hurricane Elementary School, Hurricane, Utah
North Elementary School, Cedar City, Utah

EDMUND GEO. GOOD, JR., Harrisburg, Pennsylvania
Cumberland Valley High School, Silver Spring Township, Pennsylvania
Highland Elementary School, Highland Park, Pennsylvania

GRASSOLD-JOHNSON & ASSOCIATES, Milwaukee, Wisconsin
Lutheran High School, Wauwatosa, Wisconsin

GRAVES & TOY, Charlotte, North Carolina
● West Charlotte High School, Charlotte, North Carolina

ROBERT A. GREEN, Tarrytown, New York
Webutuck Central School (6-12), Amenia-Millerton, New York
Hartsdale Elementary School, Hartsdale, New York

GRIFFIN & GOMON, Daytona Beach, Florida
Cocoa High School, Cocoa, Florida

HARRIMAN, WILLIS & HAYDEN, INC., Boston
■ Tower Street Elementary School, Westerly, Rhode Island

DONALD R. HOLLIS, Overland Park, Kansas
♦ Rushton Elementary School, Mission, Kansas

VICTORINE & SAMUEL HOMSEY, Wilmington, Delaware
Charles Richard Drew Elementary School, Wilmington, Delaware

JAMES M. HUNTER, Boulder, Colorado
Base Line Junior High School, Boulder, Colorado

WM. B. ITTNER, INC., St. Louis, Missouri
Kirkwood Senior High School, Kirkwood, Missouri

WM. NELSON JACOBS ASSOCIATES, Boston
Field House, Westboro, Massachusetts

WILLIAM ARILD JOHNSON & HARRY E. BOTESCH, Everett, Washington
Ocosta Combination School (12 year), Ocosta, Washington
Maple Park Elementary School, Edmonds, Washington

WARREN W. KANE, Austin, Minnesota
Independent Consolidated School District Junior-Senior High School, Grafton, Iowa

KELLY & GRUZEN, Newark, New Jersey
● Passaic High School, Passaic, New Jersey

JAMES J. KENNEDY, West Englewood, New Jersey
Holy Rosary Elementary School and Convent, Edgewater, New Jersey

KETCHUM, GINÁ & SHARP, New York City, New York
● Hollow Tree Elementary School, Darien, Connecticut
■ Middleville Road High School, Northport, New York

LOUIS C. KINGSCOTT & ASSOC., INC., Kalamazoo, Michigan
North Elementary School, Chelsea, Michigan
Jefferson Elementary School, Manistee, Michigan

DONALD BEACH KIRBY & ASSOCIATES, San Francisco, California
Dan H. White Elementary School, Rio Vista, California

KNAPPE & JOHNSON, ARCHITECTS, New York City
Hicksville High School, Hicksville, New York

LOWELL LAMMERS, Baytown, Texas
Agricultural and Woodworking Shop Building, Robert E. Lee High School, Baytown, Texas

LEAPER & GILBERT, Wichita, Kansas
Lincoln Elementary School, El Dorado, Kansas

LOEWENSTEIN-ATKINSON ASSOCIATES, Greensboro, North Carolina
David D. Jones Elementary School, Greensboro, North Carolina

MAYNARD LYNDON, Los Angeles, California
Royal Oaks Elementary School, Duarte, California

MacCONNELL AND WALKER, Apponaug, Rhode Island
Davisville Elementary School, North Kingstown, Rhode Island

MADISON & SMITH, Royal Oak, Michigan
Utica Community High School Building, Utica, Michigan

RICHARD J. NEUTRA & ROBERT E. ALEXANDER, Los Angeles, California
■ Business Education Building, Orange Coast Junior College, Costa Mesa, California

BUREAU OF CONSTRUCTION, NEW YORK CITY BOARD OF EDUCATION, Long Island City, New York
Public School 19, Manhattan, New York City

NICHOLS & BUTTERFIELD, West Hartford Connecticut and PERKINS & WILL, Chicago, Illinois
■ East Hartford High School, East Hartford, Connecticut

R. B. O'CONNOR & W. H. KILHAM, JR., New York City
Angeline M. Post School, Wilton, Connecticut

ALVES D. O'KEEFE, Plymouth, Indiana
South Elementary School, Nappanee, Indiana

C. WILLIAM PALMER, Detroit, Michigan
Daniel Webster Elementary School, Detroit

PERCY H. PERKINS, JR., Atlanta, Georgia
Evans County Training School (12 year), Claxton, Georgia

PERKINS & WILL, Chicago, Illinois
Hoover Elementary School, Neenah, Wisconsin
■ Blackhawk Elementary School, Park Forest, Illinois

ROBERT BILLSBROUGH PRICE, Tacoma, Washington
Sherman Elementary School, Tacoma, Washington

PRITCHARD & NICKLES, Tunica, Mississippi
Oakhurst Replacement Elementary School, Clarksdale, Mississippi

QUADREX ARCHITECTS AND ENGINEERS, Salt Lake City, Utah
St. Francis Elementary-Junior School, Provo, Utah

REINHEIMER & COX, Texarkana, Texas
High School, Texarkana, Arkansas

AMBROSE M. RICHARDSON & ERNEST L. STOUFFER, Urbana, Illinois
Law Building, University of Illinois, Champaign, Illinois

HERMAN O. RUHNAU, Riverside, California
Chemawa Junior High School, Riverside, California

SARGENT-WEBSTER-CRENSHAW & FOLLEY, Syracuse, New York
■ Hudson Falls Junior-Senior High School, Hudson Falls, New York

SCHWEIKHER & ELTING, Chicago, Illinois
Schaumburg Elementary School, Schaumburg, Illinois

SHARP & THOMPSON, BERWICK, PRATT, Vancouver, British Columbia
Nelson Junior High School Addition, Nelson, B.C.
University Hill Junior-Senior High School, Vancouver, British Columbia

SHEPLEY, BULFINCH, RICHARDSON & ABBOTT and SMITH & SELLEW, Boston, Massachusetts
■ Natick Senior High School, Natick, Massachusetts

SIMONS & LAPHAM, Charleston, South Carolina
Memminger Elementary School, Charleston, South Carolina

EBERLE M. SMITH ASSOCIATES, INC., Detroit
● Transportable Four-Classroom Elementary School, Dearborn, Michigan

HARVEY P. SMITH & ASSOCIATES, San Antonio, Texas
San Marcos Junior High School, San Marcos, Texas

NEAL BARTON SMITH, Royal Oak, Michigan
Addition to Brandon Township Elementary School, Ortonville, Michigan

SMITH, VOORHEES, JENSEN, SILLETTO & ASSOCIATES, Des Moines, Iowa
Marcus Elementary School, Marcus, Iowa

WAHL SNYDER, Miami, Florida
North Miami Elementary School, North Miami, Florida

SPAHN & BARNES, Cleveland Heights, Ohio
Lowden Elementary School, South Euclid, Ohio

BURETT H. STEPHENS–ROBERT H. STEPHENS, New Bern, North Carolina
Trent Park Elementary School, New Bern, North Carolina

EUGENE D. STERNBERG, Denver, Colorado
Sunset Elementary School, Craig, Colorado

HUGH STUBBINS ASSOCIATES, Cambridge, Massachusetts
The Country Elementary School, Weston, Massachusetts

EATON W. TARBELL & ASSOCIATES, Bangor, Maine
All Souls Church School (nursery & Sunday), Bangor, Maine

HARRY A. THOMSEN & ALECK L. WILSON, ARCHITECTS, San Francisco, California
Forest Products Laboratory, University of California, Berkeley, California
A. P. Giannini Junior High School, San Francisco

WM. M. VAN FLEET, Eureka, California
Freshwater Elementary School, Humboldt County, California

JOHN S. VILLESVIK, Yakima, Washington
Arthur H. Smith Elementary School, Grandview, Washington

WETHERELL & HARRISON, Des Moines, Iowa
May Goodrell Junior High School, Des Moines, Iowa

WURSTER, BERNARDI & EMMONS, San Francisco
Belshaw Elementary School, Antioch, California

YOUNG & LLOYD, Albany, California
Boys' Gymnasium, Liberty Union High School, Brentwood, California

YOUNG, RICHARDSON, CARLETON & DETLIE, Seattle, Washington
Paramount Park Elementary School, King County, Washington

TOP AWARD WINNERS, 1951 COMPETITION

CAUDILL, ROWLETT, SCOTT AND ASSOCIATES, Bryan, Texas
Elementary School, Stillwater, Oklahoma

EDWARD FLEAGLE, Yonkers, New York
Colonial Heights Elementary School, Yonkers, N. Y.

REISNER & URBAHN, New York, New York
Lido Beach School, Long Beach, New York

EATON W. TARBELL & ASSOCIATES, Bangor, Maine
Vine Street School, Bangor, Maine

JOHN CARL WARNECKE, San Francisco, California
Mira Vista Elementary School, El Cerrito, California

SHARP & THOMPSON, BERWICK, PRATT, Vancouver, B. C., Canada
Stanley Humphries School, Castlegar, B.C.

TOP AWARD WINNERS, 1952 COMPETITION

DONALD BARTHELME AND ASSOCIATES, Houston, Texas
West Columbia, Texas, Elementary School

RALPH BURKHARD, Seattle, Washington
Foster Junior-Senior High School, Seattle, Washington

KETCHUM, GINÁ AND SHARP, New York, New York
Darien, Connecticut, Junior High School

WILLIAM G. LYLES, BISSETT, CARLISLE AND WOLFF, Columbia, South Carolina
Wagener Twelve-year School, Aiken County, South Carolina

PERKINS AND WILL, Chicago, Illinois
Northfield Township High School, Cook County, Illinois

TOP AWARD WINNERS, 1953 COMPETITION

CAUDILL, ROWLETT, SCOTT & ASSOCIATES, Bryan, Texas
Mirabeau B. Lamar Junior High School, Laredo, Texas

CAUDILL, ROWLETT, SCOTT, NEFF & ASSOCIATES, Bryan, Texas
Sam Houston Elementary School, Port Arthur, Texas

LEINWEBER, YAMASAKI & HELLMUTH, Detroit, Michigan
Detroit University School & Grosse Pointe Country Day School, Grosse Pointe Woods, Michigan

A. G. ODELL, JR., AND ASSOCIATES, Charlotte, North Carolina
Double Oaks Elementary School, Charlotte, North Carolina

JOHN LYON REID, San Francisco, California
Deer Park Elementary School, Fairfax, Marin County, California
Manor Elementary School, Fairfax, Marin County, California

JOHN CARL WARNECKE, San Francisco, California
White Oaks Elementary School Annex, San Carlos, California

HUMAN VALUES IN SCHOOL ARCHITECTURE



by JOHN LYON REID

Architect, John Lyon Reid and Partners, San Francisco, California

Mr. Reid was an associate professor in Architecture at Massachusetts Institute of Technology from 1932 to 1940, and lectured at the University of California during 1946 and 1947. He has maintained his own practice since 1946. Mr. Reid has B.A. and M.A. degrees from the University of California and a Master in Architecture from M.I.T.

FUNCTION! Economy! Maintenance! School building planning invariably starts on this trinity. All planning participants, educators, architects and taxpayers find that these are principles on which an immediate and enthusiastic agreement can be found and all schoolhousing design problems start comfortably down the road from there to "adequate" solution.

The building must function: it must repel uncomfortable weather, provide heat and ventilation; the lighting, both natural and artificial, must be above a minimum intensity and must not show objectionable brightness contrasts; the building arrangement must provide for the needs of the teacher, child and program; and be sound conditioned too.

The building must be economical with the first cost as low as possible, while still containing the spaces and equipment required; all areas must be doubly and trebly useable and each square foot that cannot be justified in function should be questioned; operation costs that stem from planning and design must be at a minimum.

Building maintenance must neither present problems nor produce costs: the roof must not require too frequent replacement; walls and floors should not show dirt (or at least, not much); toilet rooms should be easily cleaned; the heating system must be trouble free; and hardware should be able to withstand catastrophic violence.

Although the solving of building design problems on the terms of these three principles is not always simple, the principles themselves are easy to understand and easy to talk about and around. This, I suppose, explains why it is such a popular pastime to come to garrulous and gleeful grips with function, economy and maintenance in panel discussions by both educators and architects at conventions and assemblies, and why most speeches on school planning start with these three as subject matter.

Since 1945 and the end of World War II, the expansion of our child population has been so astounding and the volume of new school construction so

Hans Brady



Classrooms should be designed to encourage learning experiences which do not rely on book knowledge alone. This room is in the Montecito School, Martinez, California, John Lyon Reid, architect.

enormous, that education has needed all the friends it can make or find to support the demands not only of growth but of enrichment and improvement. This rate of expansion and the richer offerings of the educational program mean that more money is necessary to support our public schools.

The Trend to Austerity

People have not always offered this increased support and some alarm is occasioned by the frequency of the defeat of school bonds in elections. One answer to criticism is to reduce the cost of education and schoolhousing and to ignore the consequent reduction in educational offering. So school boards are often elected and superintendents appointed on their presumed ability to get rid of frills, and architects are often chosen to design austerity school buildings.

I regard with considerable apprehension the drift toward poverty in school building design in answer to alleged intolerable high costs, without an appraisal of the influence of economy type school cottages on the children who grow up in them. To be sure, the greater accomplishment is on the positive side and not nearly enough credit is given to educators and architects for the gains in education and schoolhousing. During a time of incredible price rises, the cost of school construction increased only 87 percent from 1939 to 1950, while the average rise in building cost over the same period was 150 percent. The cost of schools was held to this relatively low rate of gain even though great improvements were made in schoolhousing, such as public address systems, better heating, sound conditioning, greatly expanded work and storage equipment provisions in classrooms and infinitely better lighting.

Careful attention to the demands of function, economy and maintenance has made this accomplishment possible and has made school buildings as good as they are today. The support of taxpayers, parents and legislators for good schoolhousing is consequently earned, justified and deserved. The well recognized need for economy, the pursuit of means to accomplish it, and the continuing pressure for greater measures of austerity, however, should not unbalance our judgment to a degree that we recognize no other standards of schoolhousing design than those of function, economy and maintenance. Are we getting the kind of schools in which our future citizens will find the learning environment to fit them to cope with the problems of everyday life? Does the community concern itself at all with any deeper values in its school buildings? Unfortunately, not enough.

The Deeper Values of Buildings

These deeper values are a measure of the stature of past epochs. They have equal significance in their relation to our contemporary scene; especially so in school buildings where children are in their most impressionable years and more susceptible to the lessons

The outdoors, varied activities and flowers enhance this school scene.



Children recognize and appreciate a room that is designed for them.

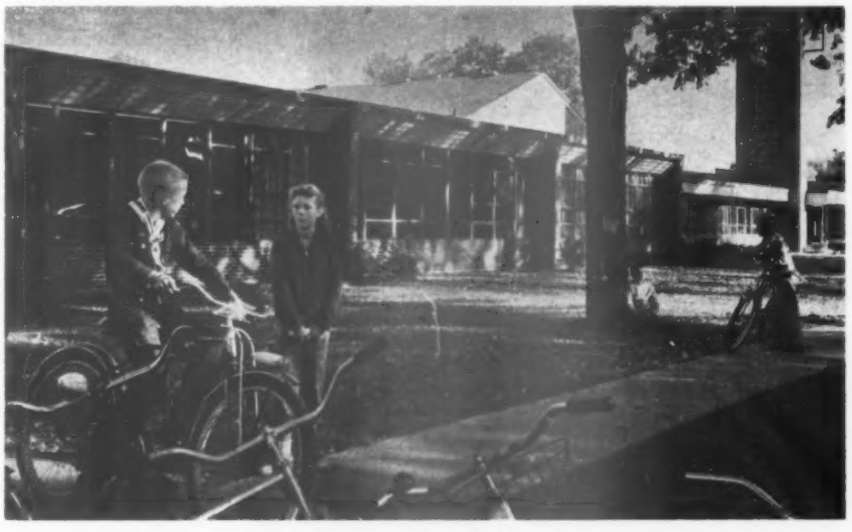


Roger Sturtevant

that may be drawn from these values than they ever will be in later years. These values represent a great resource for the educational program which has not figured as importantly as it deserves to. It is my concern here to deal with this aspect of school buildings.

What are these deeper values and what do they mean to us and to our children? From them are derived rewards that spring from good architecture in its finest sense, and the intimately related matter of human values. As a people we do not attach much importance to distinguished architecture and even the recognition of it is beyond most of us. Our failure to regard matters of architecture and quality of environment as significant is a deficiency in our national makeup. I suppose that we seem to get along well enough with a minimum of artistic and architectural perception and without a sensitivity to the quality of our surroundings. Or do we?

If I should claim that music, literature and painting were of so little consequence and meaning that the time of a child student should not be wasted on them, there would be no endorsement by educators. This knowledge is essential to the full development of a person.



Students feel that they really belong as they enjoy the school grounds of the Washington Irving School in Waverly, Iowa. Perkins and Will, architects.

Good Architecture Is Important

Good architecture is of even greater importance since we spend nearly all of our time in intimate contact with architecture, good or bad. You will remember the still sharp memory images of the buildings of your childhood and of the meanings they have to you. Likewise, think how rich and full of meaning these images can be to the child now in school, especially if they are of rooms and buildings of quality, interpreted to him by a sensitive teacher. Inspired architectural design, telling its own story of good craftsmanship, skillful planning and showing evidence of creative skill, presents learning opportunities that will profit any child. Good architecture rubs off on the child.

Human values are inseparable from good architecture. They are those things of a building dealing with character, warmth and friendliness and the usage that a good building invites and encourages. They are to be found not only in the woody charm of informal shingles, beams and trellises; they may be found as well in the concrete, brick and steel of the urban school. They are found, however, only in schools that are designed by architects who like children and who like to design schools, who work with educators who like to teach. It is impossible to define human values by compiling a check list; I shall attempt only to point directions which may assist in the achievement of these desirable qualities in buildings.

Most important, the school building should be designed for children and their work. There should be nothing of meanness or poverty in the form and materials of the building. I do not infer luxury of finishes nor extravagance of area, but rather that the countenance of the building should be modest, honest and dignified; that the building should regard its occupants as friends and human beings of dignity, not as young monsters whose only desire is to deface, and whose every moment requires policing and supervision. A school designed to resist malice and defacement will only tempt the very acts.

Color Is Important

Color is a facet of building design of primary importance. The right color design for a building, especially a school building, requires the exercise of a sensitive skill and judgment tempered by experience, a knowledge of architectural form and a regard for the occupants. Color is often the part of a building design that makes the greatest impression at first sight. Color is a matter of design and mood, it is both an art and a science, and not a matter for decision by committees acting on opinion or prejudice. Let your architect take the lead in this matter.

When the teacher and the student become aware of the fact that the school was designed for them and belongs to them, pride in the school and a feeling of ownership become intensified. The building should, by its arrangement and basic landscaping, invite the planting of shrubs and trees, the seasonal rotation of plant materials and should encourage all activities that make the user feel a responsible ownership. Moveable work furniture, equipment and teaching aids permit the teacher and her students to arrange a room not only to suit the learning needs of the current work program but, much more important, to let them design the room in their own way; all these deepen the sense of ownership.

Good Lighting Is Important

Well balanced light, even and free of bothersome brightness contrasts, provides an environment in which learning goes ahead with maximum speed and ease. But it also affects behavior, tempers and manners. I have no laboratory data to prove that tensions are created and aggravated by bad lighting but the testimony of many teachers has confirmed this. Spirits are highest and work is best in a clean, well maintained school plant. Dirt and deterioration are usually evidence that no one cares about the building and this can create indifference that affects all attitudes and activities in the school.

Krantzen



When students feel that a school is designed for them a sense of ownership develops. This outdoor area is part of the Glenbrook High School, Northfield, Illinois, Perkins and Will, architects.

Seeking Human Values

Human values are as much what the users give the school as what it provides for them. These values must be planned for by the architect when the building is designed, and then cultivated by the users after occupancy. It is as much a matter of school district, superintendent, teacher, custodian, pupil, as it is of architect. Human values, whatever they are and wherever they come from, cannot exist in an atmosphere of indifference; they must be sought and cherished.

If good architecture and human values are important, then, how much do they cost and how can we be assured that they will be delivered? Good architecture does not mean decoration, rare finishes or extravagance of any nature. No crimes against function, economy or maintenance should be committed or allowed in the name of architecture. Nor should the inclusion of human values in a building require extra money. None of these costs a cent.

Good architecture is not a commodity; it cannot be stipulated in the contract between school district and architect as one of the terms; nor can a consultant be invested with policing powers to enforce good architecture. A good architect is essential. But he must establish with his client the kind of relationship that will encourage more than the routine adequate building plan. We are looking for the "adequate" and more; we want a building that shows some qualities of the spirit.

Good architecture takes place only when there is a condition of mutual respect and understanding between educator and architect, and when the work of these two is sustained by a knowledge that deeper values have a real and worthwhile significance which, when achieved, will be rewarded by recognition and appreciation.

SCHOOL AND MUNICIPAL RELATIONSHIPS IN OVERALL COMMUNITY PLANNING



by A. BENJAMIN HANDLER

Associate Professor of Planning, University of Michigan, Ann Arbor, Michigan

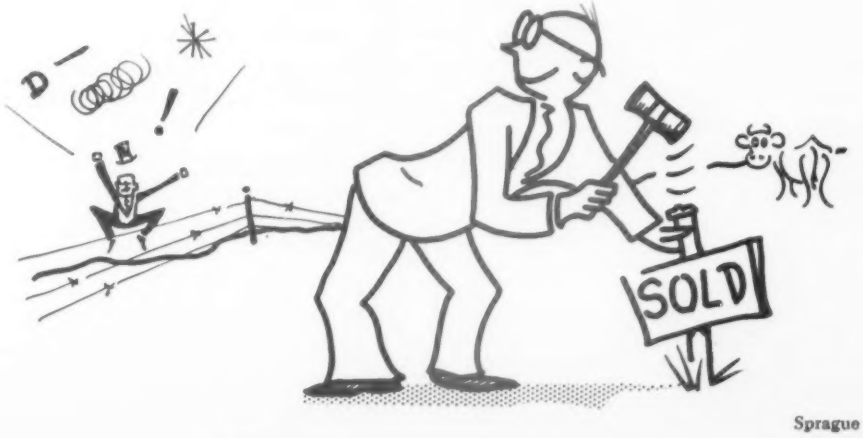
Mr. Handler has conducted wide research in housing and economic planning. He was executive secretary of the Social Science Research Council Committee which prepared the report, *Historical Statistics of the United States*. He was also in charge of preparing the report, *High Cost of Housing*, for the Joint Congressional Committee on Housing. Mr. Handler has a B.A. from Queens University, Canada, and an M.Sc. from the University of London.

SEVERAL years ago the school board of one of our large cities asserted its independence of the municipal administration in the following manner: it refused to cooperate with the city in formulating requests to the legislature unless one-third of all new revenues were dedicated to school use; and it objected to further integration with city government. This last was not a demand to be freed from the various services provided by the city, but to be able to tax to the highest possible limit independently of the city's taxing authority and of all city financial planning. The school board acted in this manner on the grounds that its independence was being impaired and that it was therefore unable adequately to promote the interests of education.

Recently, in a small midwestern city two conflicts of interest arose between the school board and the city council within a few months of each other. In the first, the school board had bought a parcel of land. The council claimed that it had been preparing to buy this land itself; the land was better suited for its purposes than the use to which the school board was going to put it; and the school board was well aware of the council's interest in the land.

The second conflict concerned the location of a shopping center near a recently built public school. The planning commission had allocated the land for commercial purposes before the school was built and had objected that the site was not suitable for a school. When the commission approved the erection of a shopping center on the previously allocated site, the school board objected that it was too close to the new school. In the ensuing argument, board members expressed themselves as having greater confidence in their planners than in the planning commission.

Such conflicts between two public bodies representing different aspects of community life are not uncommon. They may be and often are harmful to the interests of the community itself, not so much because of the public airing of the difference with its usually accompanying acrimony, but because of the atmosphere of competition between public bodies, each acting independently of the other and concerned solely with solving its own particular problems regardless of the



Sprague

Conflicts over land may arise between the school board and municipal agencies. Both factions may wish to buy available land to suit their own purposes.

problems of the other. Without machinery to settle such differences, the best overall interests of the community are achieved only accidently. Decisions tend to be reached on a partial appraisal of only the short-run aspects of a given situation by the body which happens to act first.

School Independence—Yes or No

Nevertheless, educators as a body are committed to the proposition that school districts must be independent. By this they primarily mean fiscal independence or complete control over the school budget and school tax levy. Sometimes independence is extended to mean non-interference by municipal agencies in any matters pertaining to schools.

The arguments advanced in favor of independence are that it is necessary: (1) if schools are to get their fair share of financial support and secure the greatest possible public backing; (2) if schools are to be kept out of politics and uncontrolled by politicians.

Counter-arguments against independence, advanced largely by public administrators, run somewhat like this: (1) the community benefits from comprehensive budgetary planning and execution where all public functions are weighed against each other. This is necessary in order to avoid duplication and overlapping in the present complex of intergovernmental relations. By facilitating the coordination and integration of services in which the school and municipality are both interested substantial economies can be achieved; (2) independence does not take schools out of politics nor guarantee greater financial support for education. Educators labor under the conscious assumption that there is something unclean or unwholesome about municipal politics, that municipal authorities are enemies of the schools and that individuals elected to boards of education are somehow more competent and trustworthy than elected municipal officials. But politics in the management of schools come just as frequently from school boards as city officials. Superintendents are engaged in continuous battle with school boards which tamper with the curriculum and methods of instruction. In point of fact an independent school board can and often does mean "two sources of political interference instead of one."

The answer is to put the schools more fully into politics, keep them before the public eye, subject them to intelligent democratic control, and by taking them out of isolation make them more responsible, accountable and responsive to the will of the people. Keeping educational control close to the people will guarantee the freedom essential for adaptability, adjustment and invention.

All Services Are Improved

A study designed to determine what substance there is in the respective arguments found no evidence that school welfare was effected by coordination in issuing school and municipal bonds, selecting school sites or constructing school buildings; or that independent school districts get more adequate financial support. On the contrary, the record indicates that school-municipal cooperation has improved the services of both far more frequently than it has impaired those of either.

School-municipal cooperation does not mean that fiscal control should be separated from responsibility for education. The agency having such control ultimately determines educational policy. Division of authority obscures objectives and confuses issues. When, however, fiscal control is extended to encompass complete fiscal independence, then it involves setting up enclaves of educational sovereignty in our communities. Relations with other local public bodies would then be strictly diplomatic, and the kind of interaction which would best promote overall community interests would be impossible.



Educators labor under the conscious assumption that there is something unclean or unwholesome about municipal politics. However, politics in the management of schools come just as frequently from school boards as from city officials.



School sites and city park developments are often integrated. In some cities it is mandatory that cooperation be maintained between school boards and city planning commissions in the selection of new school sites.

Yet, this can hardly be what they mean when educators argue for fiscal independence and, in almost the same breath, for the need for coordination and cooperation in the provision of educational services. The first of these concepts arises from the traditional posture of battle against irreconcilably hostile municipal forces. The second is a recognition of their common interests. Since they are mutually contradictory, it becomes impossible to move towards their simultaneous practical implementation. One must give way.

The Case for Coordination

The purpose of coordination and cooperation is to ensure that decisions are well considered. Mistakes inevitably lead to either or both of two consequences—educational and often community needs are not met; a needless drain is imposed on the community's resources. Their avoidance is especially necessary with respect to buildings and other capital facilities which affect the community and its people over long periods of time. Only if the overall viewpoint is considered, together with the proper relationship of the parts to the whole and to each other, can the needs of any community be met adequately and economically.

Educational policy has no self-contained existence apart from other aspects of the social and political life of the community. The very existence and nature of a community depends upon the relationships which prevail among its various policy-making groups. The extent to which they act in isolation is a precise measure of the extent to which the community tends to fall apart. For a broad, coherent social policy to emerge they must in some manner integrate their individual activities.

Moreover, truly independent action is non-existent. Cooperation of one sort or another is widespread, with municipal and state agencies everywhere rendering services to schools. City and county officials generally perform the administrative duty of levying and collecting school taxes, frequently exercise some measure of control over school expenditures and even affect the design of schools. The school board usually looks after the construction of its projects; but in some instances municipal officers perform this service. Joint action on the selection of school sites is frequent, with responsibility for making the choice given to one body with the approval of the other required.

Coordinating Recreational Facilities

Recreational facilities are such an essential part of the school program that the concept of an independent school system does not fit the practical situation in this area of endeavor. Often, coordination of school and municipal recreation programs is required by law. In Michigan, for example, school officials are authorized to permit municipal authorities to use school facilities for recreation purposes; while in some states the reverse relationship prevails. School board representatives are frequently on municipal recreation boards, and much voluntary cooperation exists in the support and direction of recreation programs. In some cities school boards are responsible for recreation, and in others they share responsibility on a joint commission. Frequently, the city supervises all school grounds and buildings to the extent needed outside school hours. Often the sites of

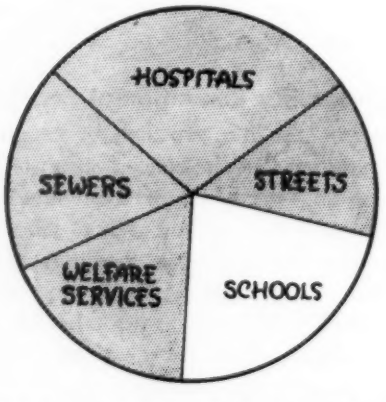
new schools and city park developments are integrated.

Cooperation between school boards and planning commissions in the selection of school sites for new subdivisions is mandatory in California. The board of education in Cincinnati withholds final decisions on the selection of sites until they have been checked by the city planning commission. In Minneapolis the city treasurer, comptroller, counsel, purchasing agent and civil service commission perform the same services for the school board as they do for the municipality. The city supervises school board elections. Though the school board plans and determines the location of school buildings, the planning commission provides the necessary information. The city counsel has to approve the borrowing plans of the school board and the city sells the bonds, which become part of the city debt.

Such a rendering of services by the municipality to the school board is far from a coordination of their activities. Cooperation in Cincinnati has gone far beyond this. For over two decades the city, the county and the school district have cooperated in long-term financial planning. No legal authorization exists. It is purely voluntary with the Cincinnati Bureau of Governmental Research providing the data and expert assistance. Every year representatives of the three overlapping local government authorities present their several capital outlay proposals at a meeting convened for this purpose. Here adjustments are made so that all the improvements are correlated with each other and with total community resources. This kind of integration is unusual.

Capital Budgeting

Even more unusual is a long-range capital improvement program, commonly known as a capital budget, which encompasses all public municipal bodies. Any budget is essentially a future financial plan of action for the exercise of foresight and control over recurring needs. To attain maximum effectiveness and be able to cope with changing needs and circumstances as they occur, it must be a continuous process subject to periodic review. Capital budgeting, as distinct from the budgeting of current operations, involves making estimates in conjunction with a long-term building and equipment improvement program. It may cover a period of five or six years.



Capital budgeting, as distinct from the budgeting of current operations, involves making estimates in conjunction with a long-term building and equipment improvement program.

A year is too short a period for the financial planning of capital needs, because buildings and equipment yield utility over long periods of time. Moreover, the money for them seldom can be raised out of current revenues but must be borrowed. This means that the capital budget must include a plan to finance the debt charges out of revenue over the life of the loan.

It is possible to have a capital budget for schools alone. The ingredients of adequate school plant planning or capital budgeting consist of a continuous long-term program of: (1) the types of improvements to be undertaken; (2) their timing and costs in the light of school populating trends, the physical growth and expansion of the city, the changing conceptions of education and the place of the school in the community; and (3) a coordinated program of the method by which the capital improvements are to be financed in terms of the financial capacity of the community.

Three Basic Ingredients

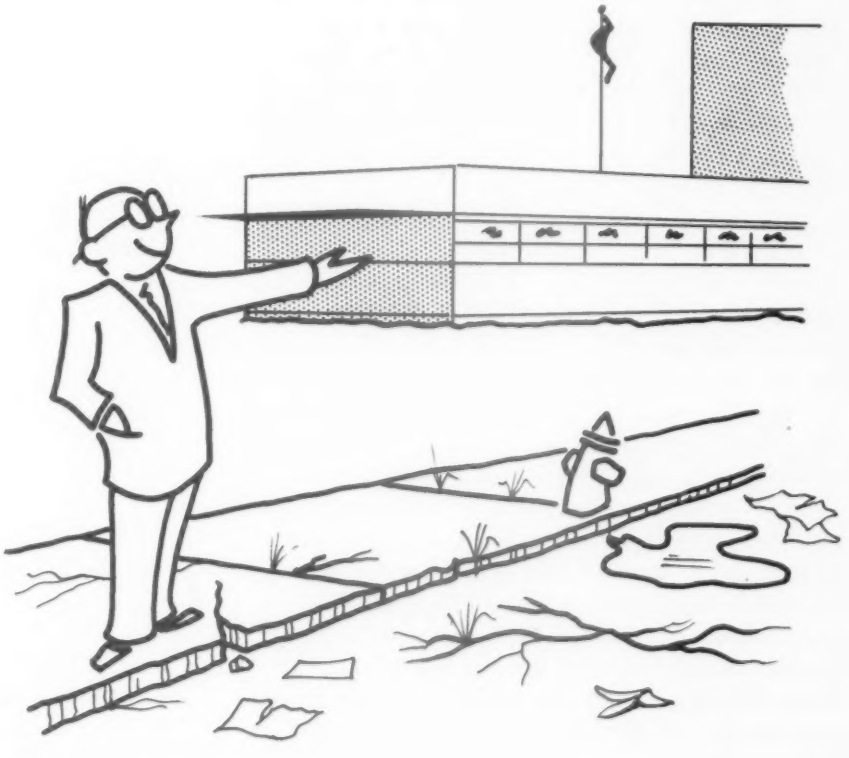
Rooted in an educational plan which defines school policies and the educational program, the capital budget in its monetary aspects is made up basically of three ingredients—investment, revenue and expenditures. The first, investment, is capital outlay or the cost of putting the various planned facilities in place. The second, revenue, is the amount of income receipts required and the sources of these receipts, whether out of current revenue or through borrowing. The third, expenditures, comprises amounts laid out for construction, for principal repayments and for interest charges on borrowings.

The system of accounts would consist of four schedules: (1) capital outlays annually over a five or six year period; (2) amount of outlays to be financed through cash or current revenues and through borrowing annually for the same period; (3) amounts to be collected annually for the life of the loans from each of the various sources of revenue; (4) annual expenditures for the life of the loans for repayment of principal, for interest and directly for capital outlays. It must be recognized, however, that this is merely the accounting mold into which the end results of the capital budget have been cast—and a simplified one at that. Capital budgeting is far more than this. It is a complicated process of policy determination, program analysis, administrative coordination and planning integration. Upon the adequacy of these depends the adequacy of the end result. They are the crux of capital budgeting.

Capital Budget and Overall Planning

Since a capital budget for education is essentially a way of implementing educational policy, which is but one aspect of broad social policy, it cannot be divorced from the many ways in which other public capital projects are implemented. In order to avoid conflict, school plant planning has to be woven into the total fabric of community planning.

To achieve a coherent policy for the community as a whole, the educational capital budget has to be correlated with city planning, public works planning, municipal financing and budgeting. If budgetary planning becomes a competitive battle for tax revenues, then educational along with other community needs suffer by reason of their too narrow definition in each instance. On the other hand the whole budgetary process, conceived as a cooperative endeavor, constitutes a unifying force for the community, expressive of a broad social policy and the social needs of the people.



The courts have ruled that exorbitant demands by the board of education might very well make it impossible to carry out other important municipal projects.

Duplicate Services Eliminated

A capital budget, by its very nature, makes for such cooperative planning. As an implementation of long-range and well defined objectives, it tends to minimize the demands of special interest pressure groups and other short-sighted considerations. The very act of defining objectives reveals any contradictions that may exist between them and special interest demands. Moreover, the drive to achieve clear objectives soon makes it apparent that educational goals cannot be gained in isolation from similar community drives. Furthermore, a close relationship between school and municipality would result in a simplification in the machinery of government and the elimination of duplication of services with a consequent reduction in their cost to the community.

The courts have stated the benefits to be derived from school-municipal coordinated capital budgeting clearly and succinctly: "Exorbitant demands by the board of education might very well make it impossible to carry forward other municipal undertakings of the greatest importance. There is sound policy in centralizing the taxing authority where a proper balance and proportion may be fixed and maintained in the matter of tax levies for all municipal purposes." A coordinated capital improvement program would arrange several years of future outlays in the order of need for the community as a whole. By determining for the same length of time how each project is to be financed, it would permit a careful balancing of community and not just educational need and ability to pay. It would, moreover, make it possible to stabilize construction activity and with it the tax burden, as well as to facilitate orderly debt retirement.

The consequences of this is that vitally needed improvements would not be deferred in order to keep taxes down; nor would uneconomical and large bond issues be voted on a wave of whipped-up enthusiasm. In many instances the insight and control over the community's overall financial situation which would result

from coordinated action might prevent rapid capital expansion chargeable to all the people by the isolated actions of independent authorities and a consequent pyramiding of debt beyond the community's financial ability. This is particularly necessary because debt commitments are not subject to future modification. A rational fiscal policy would, in addition, improve the city's credit and, by reducing financial charges on bond issues, ultimately be reflected in lower taxes.

Expansion of City Services

The school-municipal relationship must of necessity go beyond the mere division of revenues between school and municipal authorities. The institution of a capital budget would require an expansion of services rendered by the city to the schools. It would have to supply additional data in considerable quantity, and at least some technical assistance in estimating school plant needs, programming and financing. More important is the fact that without real municipal-school coordination a capital budget for education cannot achieve its objectives. Without a street development plan it becomes difficult to select the sites of future schools with a view to avoiding traffic hazards. For high school site planning, information on the location of transportation lines is needed because many of the pupils will travel far to school. Land use information is needed to avoid placing prospective schools in future business districts.

If school districts are not to become depopulated through the development of a blighted area around schools, cooperation with the zoning authorities is necessary to prevent undesirable encroachments on residential neighborhoods. Furthermore, adequate school facilities today require a close physical relationship between recreational and school areas. It is necessary also to coordinate the siting of future schools with city growth. The placing of schools has a decided influence on the location of housing developments. The city planning, not the school, authorities are best equipped to influence the direction of city growth. Consequently, the latter should in all instances relate their activities to the planning of the former. If the two run counter to one another, the result is likely to be detrimental both to the school system and to community development as a whole. The process of cooperative capital budgeting will help to reveal such contradictory and self-defeating elements in prospective courses of action.

A capital budget for education can operate only in an atmosphere of mutual advantage to both school and municipality, not in one of fighting to wrest the greatest possible advantage for either side. Where coordination and integration are really practiced, the question of dependence becomes academic in other than a purely legal sense. And when the assumptions implicit in any capital budgeting process—that the financing of schools comes from the same taxpayers' pockets as do other municipal improvements and that one community function cannot expand at the expense of others—are accepted, then coordinated school-municipal cooperation is a necessary corollary.

Remember the Taxpayer

The taxpayer wants no extraordinary demands to be made on his purse. Consequently, the regularization of capital outlays must be accompanied by a similar stabilization of the tax rate. The important thing is that obsolescence and wear and tear be regularly made good as required; and that expansion be foreseen and planned for. This involves long-range budget management directed towards the levelling out of debt service payments and cash outlays for capital facilities.

It may be difficult for the school system to achieve fiscal stability, nor is this necessary for achieving the objectives of capital budgeting. The same persons pay taxes to both school and municipality, both of whose revenues are derived largely from property taxes and usually are collected together. What the taxpayer desires is total property tax stability. This is rendered more feasible if both agencies coordinate their capital improvement and borrowing programs. The former can then be programmed according to the urgency of needs, taking into consideration those of the whole community. This permits greater flexibility in scheduling and greater leeway in postponements so as to stabilize the overall property tax rate without impairing community objectives.

SIGNIFICANT TRENDS IN STATE AND FEDERAL SUPPORT FOR SCHOOL BUILDINGS



by R. L. JOHNS

Head of the Department of School Administration, University of Florida, Gainesville

Dr. Johns has received Ph.D. and M.A. degrees from Teachers College, Columbia University, and a B.S. degree from Southeast Missouri State Teachers College. He has held his present position at the University of Florida since 1946, and has authored numerous articles on school finance.

PROVIDING adequate school buildings is a major problem facing American public education during the next ten years. The recent Federal "School Facilities Survey" indicates that the accumulated school building need expressed in dollars is in excess of ten billion dollars. Reliable estimates of school population growth in the United States indicate that the school population will increase by approximately one million annually during the next ten years.

Assuming conservatively that the cost of providing buildings for school population increases will be $1,000 per student, it will require a billion dollars annually for the next ten years to keep up with school population growth. The depreciation on present buildings is approximately a half billion dollars annually. Therefore, it is conservative to estimate that it will require an expenditure of 25 billion dollars during the next ten years to provide adequate school facilities for all children in the public schools. This estimate does not include interest charges on borrowed funds. These charges will be considerable because most of the funds used for public school buildings during the next ten years will be borrowed funds.

Ignoring interest charges, the annual expenditure for school buildings during the next ten years should be two and one-half billion dollars. The total revenue receipts of the public schools in 1953–54 totaled approximately seven and three-fourths billion dollars. It would then require an expenditure of one-third of our present revenue receipts to provide school buildings, if they were to be constructed exclusively from current funds. Yet, there are very heavy demands upon the school budget for an increased number of teachers, for higher teachers salaries, and for raising the level of expenditure for other important items. Therefore, an exclusive pay-as-you-go construction policy is not practicable.

Bulletin Outlines Problems

The U.S. Office of Education and the University of California, Berkeley, under the sponsorship of the National Council of Chief State School Officers, made a comprehensive cooperative study of "State Provisions for Financing Public School Capital Outlay Programs in 1950." The findings of the study were published in 1951 by the U.S. Office of Education, Federal Security Agency, in Bulletin No. 6. This bulletin presents a thorough analysis of problems facing boards of education in providing school facilities and state provisions for financing public school capital outlay programs. Among the findings of this study are the following:

1. School buildings were not being constructed at a rate which would take care of accumulated need and school population growth.
2. The school population was increasing much faster than the growth in assessed valuation.
3. Most states were relying upon local bond issues paid from property taxes to finance school buildings.
4. The assessed valuations of property had not increased as rapidly as the index of school building costs.
5. Most of the states had bond limitations which made it impossible for many school districts to meet their building needs, even though the maximum of bonds were voted.
6. Only 19 of the 48 states had any financial provisions worth mentioning for assisting local boards of education with their capital outlay programs.
7. Many of the 19 states which, in 1950, provided some state financial assistance to local boards of education in meeting their capital outlay needs, had inadequate plans either because of limited funds, inequitable methods of state distribution or undesirable administrative provisions.

The writer recently sent a questionnaire to each of the 48 states to collect information concerning changes in state plans for capital outlay assistance since 1950. Information was received from each state either by questionnaire or public documents. The writer is indebted to one or more members in each state department of education for furnishing the information neces-

sary for this study. The findings are reported in the following paragraphs.

State Appropriations in 1953-54

A number of the states are appropriating funds directly from the state treasury to assist boards of education in meeting their capital outlay needs. Fifteen states appropriated a total of $35,203,000 for this purpose in 1953–54. Two other states, Arkansas and Kentucky, adopted the policy of state aid for capital outlay but had not yet implemented the policy. Arkansas included capital outlay in its foundation program in 1951 but has made no funds available since then for that purpose. Kentucky adopted a foundation program, including provision for capital outlay, which became effective July 1, 1954.

State Appropriations for Capital Outlay for the Public Schools 1953–54

State	Amount of Appropriation	Type of Appropriation	
		Regular	Emergency
Alabama	$ 1,955,087	x	
Arkansas	*		
Connecticut	1,809,368	x	
Delaware	12,239,080		x
Florida	8,800,000##	x	
Georgia	14,500,000##	x	x
Kentucky	***	***	
Louisiana	500,000**		x
Massachusetts	2,600,000#	x	
Mississippi	1,500,000	x	
Missouri	1,700,000	x	
New York	6,200,000	x	
Ohio	1,500,000		x
South Carolina	10,246,000##		
Tennessee	6,300,000	x	
Utah	2,157,000		x
Virginia	15,000,000		x
TOTAL	$35,203,000	9	6

* State legislature included capital outlay in the plan of state support but provided no funds.

\# State pays part of annual debt service on local bond issues for approved projects. State is now obligated to pay $75,000,000 on a total outlay of $225,000,000 since 1946.

** For vocational education only.

\#\# Each of these states has a plan under which districts may receive a twenty year advance on their annual appropriations. The state accomplishes this by issuing securities and repaying them from the amounts due the districts which received the advances.

*** A regular allotment for capital outlay will be included in the Foundation Program appropriation beginning with the 1954-55 fiscal year.

While most states still do not make annual provisions in their budgets for capital outlay assistance to local boards, it seems that this practice is growing.

Furthermore, some states have incorporated, in their plans of state support provisions for annual capital outlay, proportionate allotments which give more funds to districts having the least financial ability. Although the total amount of state funds available annually for capital outlay is small, the effect of these funds is significant because they are allocated for the most part to districts in greatest need.

In addition to these fifteen states, many others provide considerable amounts of state aid for general school purposes, including capital outlay. In practice, however, almost all of these general state appropriations are used for current expenses.

States Issuing Bonds

Eleven states have issued bonds during recent years and have made the proceeds available to boards of education for school building construction. These eleven states have issued a total of more than 800 million dollars worth of state bonds for school buildings during the past four years. California has issued 435 million dollars worth of bonds, more than half the total. This procedure has had the effect of extending the credit of boards of education for school building construction.

Many boards of education are faced with restrictive debt limitations and do not have credit facilities available for constructing needed buildings. The state can usually borrow funds at a lower interest rate than most local school districts. Despite these advantages, however, no state plan is complete if it relies entirely upon borrowed funds to finance school buildings.

Five states, California, Delaware, North Carolina, Virginia and Washington, have issued bonds which are a direct obligation of the state and are retired from state revenues. The state bonds issued by California are retired in part from state funds and in part from local funds depending upon the wealth of the district.

Three states, Florida, Georgia and South Carolina, provide for the issuance of state bonds which are not a general obligation of the state. These bonds are retired from school funds for capital outlay which would otherwise be available for annual distribution to districts.

Two states, Maine and Pennsylvania, authorize the issuance of bonds by a state building authority. These bonds are not state obligations but are retired by lease-rental payments from local school districts. In Maryland the state bond issue must be repaid by local school districts.

State Loans to Local Boards

Eight states make loans from special funds to local school districts for school building construction. This practice has the effect of extending the credit facilities available to local school boards for school building construction. Five of the states make these loans from the permanent school fund and three from some special fund set up for this purpose.

State Building Authorities

Thirteen states have established some type of school building authority, school building commission or special board which has major responsibilities relating to school building construction. These boards are separate from the state board of education and state department of education, although representation from

States Issuing Bonds for Constructing School Buildings During Recent Years

State	Proceeds from Bond Sales a Direct Grant	Bonds Retired from State Appropriations to Schools	Bonds Retired from Local Funds
California*	x		x
Delaware	x		
Florida		x	
Georgia		x**	
Maine			x**
Maryland			x
North Carolina	x		
Pennsylvania			x**
South Carolina		x	
Virginia	x		
Washington	x		
TOTAL	5	3	4

* If the board cannot raise sufficient funds from a specified local tax rate to retire the bonds allotted to it, the excess bonds become a grant.

** Bonds are retired through a system of lease-rental payments.

these agencies is sometimes included in their membership. The special state agencies approve building projects in all thirteen states.

If a state board of education is properly constituted and has the necessary power and responsibility, and if a state department of education is well organized and adequately staffed, there is no reason why the state education agency should not perform all of the powers and responsibilities of these special authorities. It is not good administration to have two agencies at the state level dealing directly with local boards of education. Such a practice inevitably leads to divided responsibility.

States Which Have Established a State School Building Authority, Commission or Special Board

State	Powers of Commission or Authority				
	Approves Building Projects	Issues Securities	Makes Loans	Allots Funds	Constructs Buildings for Lease-Rental
California	x		x	x	
Connecticut	x			x	
Delaware	x			x	
Georgia	x	x			x
Indiana	x		x		
Maine	x	x			x
Massachusetts	x			x	
Mississippi	x			x	
Ohio	x			x	
Pennsylvania	x	x			x
South Carolina	x	x		x	
Utah	x			x	
West Virginia	x			x	
TOTAL	13	4	2	9	3

This trend toward increasing the number of special agencies at the state level to deal with school building programs is not a favorable one. It is believed that a better solution to the problem would be to set up a properly organized state education agency.

Some states have established local school building authorities with the apparent purpose of getting around restrictive local debt limits. Among those states are Indiana, Kentucky, Maine and Pennsylvania.

The present status and recent trends of state provisions for capital outlay programs are best evaluated in terms of the proposed characteristics of a satisfactory state program. Following is a list of suggested criteria by which the state plan may be evaluated. These criteria have in part been adapted from "State Provisions for Financing Public-School Capital Outlay Programs," by Eric L. Lindman, Clayton D. Hutchins, Edgar L. Morphet and Theodore Reller, Bulletin No. 6, U.S. Office of Education, Federal Security Agency.

1. Each state annually should provide state funds to help finance public school capital outlay programs.
2. State plans for financing capital outlay should be included as an integral part of the state's foundation program of school financing.
3. The state plan should provide for both emergency and long-range needs.
4. The program should be financed by means of an equitable combination of state and local revenues.
5. The program should be administered by the state department of education under the authority of the state board of education.
6. State school building funds should be apportioned in accordance with an objective formula incorporated in the law.
7. Consideration should be given to local taxpaying ability in apportioning school building funds.
8. Local boards should be provided with adequate credit facilities for constructing school buildings either through liberal local bond limits, the extension of the state's credit to local units or a combination of both.
9. The total state plan, including the state funds allotted annually, credit facilities, local bond limits and the organization plan for local school districts required by the state, should make adequate school facilities fiscally possible and practicable for every child in the state.

Judged by these standards most state plans for the financing of public school capital outlay programs are woefully inadequate. Only 28 of the 48 states have made any state provision whatsoever for assistance in financing public school capital outlay programs. Some of these 28 states have not implemented their plans with funds.

Twenty states have no state plan for assisting local school districts in financing their capital outlay programs. Since most of the plans provided in 28 states are inadequate, the outlook for providing needed school building facilities is not encouraging. The only encouraging fact is that there is a trend toward more states giving legislative recognition to the problem.

Specific Legislative Items

What are some of the specific items which should be included in legislative provisions for an ideal state

plan to finance public school capital outlay programs? The laws of the state should provide at least the following:

One. The state's foundation program of state support should include a minimum of $600 per teacher unit annually for capital outlay purposes from an equitable combination of state and local revenues. This estimate is based upon the 1954 purchasing power of the dollar and should be modified upward or downward in the future, proportionate to fluctuations in the purchasing power of the dollar. This $600 per teacher unit, or approximately $20 per pupil enrolled, is equivalent to the annual depreciation on school buildings. It is based on the assumption that buildings cost approximately $1,000 per pupil enrolled and that the life of a school building is 50 years.

The assumption is that all building depreciation or building replacement should be provided for from current funds. Successful business corporations annually put aside sufficient funds for plant replacement. Federal income tax laws recognize the validity of this principle and exempt corporation plant replacement funds from income taxation. Any business enterprise which consistently failed to put aside funds for plant replacement would eventually go bankrupt. It seems equally unwise for boards of education to follow a permanent policy of replacing obsolete buildings and equipment by means of borrowed funds. Such a policy increases the cost of buildings by the amount of the interest charges incurred.

Two. State constitutions and statutes should allow reasonable credit facilities by which boards of education may finance part of school building costs from the proceeds of bond sales. Building costs which should be financed from the proceeds of bond sales are those arising from increases in school population and those resulting from the reorganization of local school centers to reduce costs or increase educational efficiency.

State provisions for credit should set up reasonably liberal bond limits under which local boards may issue bonds. Furthermore, statutory provisions for bond elections should not include special restrictions making it difficult to vote a bond issue. The state might also use its own credit facilities, especially for the aid of the least wealthy districts.

Three. The statutes should require local school administrative units to be of sufficient minimum size for reasonable financial and educational efficiency.

Four. The statutes should stipulate that school plant construction programs be undertaken only after comprehensive local school plant studies are made and a long-range plan developed.

In conclusion, no state has yet devised an ideal plan for financing public school capital outlay programs. However, the plans of some states more nearly approach the ideal than do those of other states. It is doubtful whether the least wealthy states could develop an ideal plan for financing school buildings and maintain adequate current expense programs without making an excessive tax effort. Numerous studies during the past 30 years have demonstrated time and again the necessity of Federal aid to the least wealthy states.

Trends in Federal Support

It seems hardly worthwhile to discuss trends in Federal support for capital outlay. There are no significant trends. The only identifiable policy of the Federal Government, with respect to Federal support for either capital outlay or current expenses, is the absence of any well defined, defensible policy.

The only Federal funds now available for school construction are funds appropriated pursuant to Public Law 815. The Department of Health, Education and Welfare is apparently not endorsing Federal aid for general school construction beyond the areas affected by Public Law 815.

The Office of Education is now a part of the national political administration since it has been placed in the Department of Health, Education and Welfare. Therefore, the Office of Education cannot take a position on Federal support based upon research and evidence. On the other hand, the Office of Education is compelled to reflect the political views of the national administration regardless of the evidence. This state of affairs at the national level corroborates the validity of the long-time position of the educational leadership of the country—education should be organized completely independent of political administration, locally and nationally.

Those who are interested in the administration of Public Laws 875 and 815 can find an excellent summary in the Third Annual Report of the Commissioner of Education, June 30, 1953. Mr. Charles A. Quattlebaum, specialist in education, U.S. Office of Education, prepared for the Committee on Education and Labor a comprehensive report entitled "Federal Aid to School Construction," published by the U.S. Government Printing Office in 1954. It reports on the historical background of the problem, evidence of the nationwide need for school construction, variations in state ability and effort and legislative proposals for Federal aid for school plant construction.

The U.S. Office of Education published in December, 1953, a preliminary report of the school facilities survey entitled "Report of the Status Phase of the School Facilities Survey." This report contains a historical background of the school plant problem, estimates of school plant needs, estimates of enrollment increases, an inventory of school facilities and an analysis of the needs and resources of the states.



The Ralph R. Smith School is located in Hyde Park, New York. Perkins and Will are the architects-engineers. Native stone was used at the entrance and around the kindergarten partly for texture and color contrast with the brick, and partly to conform with the other schools of the community which are of stone.

BUDGETS FOR SCHOOL BUILDING PROGRAMS



by N. L. ENGELHARDT, SR.

Engelhardt, Engelhardt and Leggett, Educational Consultants, New York City

As an educational consultant to school systems throughout the country Dr. Engelhardt has made invaluable contributions to the whole field of education. Now a senior member of Engelhardt, Engelhardt and Leggett, he had taught at Teachers College, Columbia University for 27 years and was Associate Superintendent of New York City schools for five years. With his partners Dr. Engelhardt has written *Planning Elementary School Buildings*, 1953, as well as *Planning Secondary Schools*.

THE American people are rapidly acquiring an understanding of budgetary procedures and practices for their community enterprises. Often, costs of construction projects have veered widely, largely upward from early estimates, and the necessity of using a budget as an instrument of managerial control has become evident. In particular, the preparation of a school building budget, all-inclusive in its details and based on acceptable cost units, has become an integral part of school building enterprises.

In financing the annual educational program of school systems, substantial progress in budget-making has taken place over the past quarter century, and yet the day for improvement has not passed. Today, examples of outstanding current budgets are to be found in many school systems. Two excellent illustrations, one from the west and one from the east, are the San Francisco, California, annual budget prepared under the direction of Dr. Herbert C. Clish, superintendent of schools, and the Great Neck, Long Island, New York, budget developed under the guidance of Dr. John L. Miller, superintendent of schools. The details of these budgets make their summaries readily understandable and defensible. In contrast, school building budgets based on detail are rarities, although the funds involved for a single such project may equal or surpass the total of the current annual budget in many a school system.

Differences in Practices

This difference in school board budgetary practices may be attributed to several causes which do not apply equally to all school systems. This question should be raised:

> Are there differences in administrative approaches, traditional practices, placement of responsibility or in the very nature of the building enterprise which result in less significant budgetary policies and practices in the development of the school plant, as

contrasted with the advancement and management of the annual on-going program in the school system?

This is an involved question and certainly answers must be sought for its component parts. Here are listed some of the possible basic causes:

1. There is delay in recognizing the necessity and values of continuous over-all community planning and in granting to public education a top position in the planning processes of the community.

2. The master plan of a comprehensive school building survey may lessen in significance as school board members and administrators fail to serve its main purpose.

3. The indefensible emergence of an unplanned for urgent need and the rise of a pressure group may redirect the course of a predetermined plan.

4. Delays in official recognition of school building needs and in official decisions are chargeable to the concept that school building planning can be treated as intermittent or spasmodic.

5. Responsibility in building the capital plant is frequently not centered upon one individual. School board members, eager but inexperienced, find themselves obligated to make decisions under pressure and without access to essential research.

6. Professional services for planning and designing school buildings are frequently not continuous and are accorded a direct relationship with the board of education quite different from that acknowledged for the regular service groups remunerated through annual budgets.

7. Lay participation in the school planning processes becomes more concerned with intimate details of buildings themselves than in long-time aspects of developing a comprehensive plan to serve the present and future community equally well.

8. School systems have tended to delay action on school building needs with the result that essential aspects of this area of management are bypassed. Thus educational and financial losses are hidden in the impressive bulk of new structures.

9. Securing popular approval of site and building plan and especially their financing is frequently an unnecessarily involved and time-consuming process, with attendant costs difficult to anticipate.

10. Power of decision on school building developments is, in many communities, diluted by various official bodies in which reside the right to review and modify. Costs are thus affected.

The Capital Budget

There are few communities that have prepared for their citizens capital budgets representing all the local public construction needs for a five or ten year period, including those of the public school system. Inevitably, progress must be made in this direction. Such budgetary planning should cover all community services for the entire area to be served. With such a capital budget, similar purposes of different organizations are discoverable and much joint planning should result. The avoidance of duplication in auditoriums, stadiums and play areas illustrates a foreseeable gain.

School Building Program Budget

The budget of a school building program has its place in the community capital budget, and covers all the individual building projects which are needed, as discovered through a comprehensive school building survey. The anticipated budget covers a period of years to come and includes a comprehensive financing plan with a proposed amortization of existing debt and prospective additions.

Uniformity among all school systems in budget itemization cannot result because of different financing methods. The many items that enter into the budget for a school building program can, however, be listed as is done below, and selection can be made to fit local situations. Emphasis should be placed upon all possible sources of income, even of limited amounts, as well as all expenditures chargeable against the building program and its separate projects. The community experience is a sad one when all available funds are used for the building itself and such important items as preparation of play areas, furniture and landscaping are not given their rightful consideration.

Checklist of Items

Anticipated Receipts

Grants

1. Federal Grant
2. State Aid
3. Emergency State Aid
4. Emergency Federal Aid

Loans

1. Federal Loans
2. State Loans
3. Short-Term Bank Loans
4. Public Authority Loan
5. Transfers from Other Funds

Current and Reserve Funds

1. Current Annual Funds
2. Building Reserves

Bonds

1. School District Bonds
2. Premium on Bonds

Other Than Public Funds

1. Gifts from Individuals
2. Gifts from Corporations
3. Endowment Funds

Contractual Adjustments

1. Insurance Adjustments

2. Forefeiture of Sureties
3. Forfeitures from Certified Checks
4. Adjustments from Approved Building Changes
5. Adjustments for Heat, Current, Telephone and Water

Sales

1. Sale of Land
2. Sale of Buildings
3. Sale of Equipment
4. Sale of Trees
5. Sale of Topsoil
6. Sale of Sod
7. Sale of Other Items
8. Salvage of Buildings
9. Salvage of Equipment
10. Salvage of Furniture

Rentals

1. Rental of Buildings
2. Rental of Land

Interest

1. Interest on Bond Deposits
2. Interest on Building Reserves
3. Interest on Other Building Funds
4. Interest from Gifts
5. Interest on Endowments

Other Sources of Income

Expenditure Items

The Initiation of Study and Research

1. Board of Education Expenditures
   a. Preliminary conferences
   b. Preliminary travel
   c. Preliminary publicity
   d. Pertinent books
   e. Pertinent magazines

Comprehensive School Building Survey

1. Contractual Agreement
   a. Completed report on long-time program
   b. Additional copies of report
   c. Maps of school district
   d. Blueprints of existing buildings
   e. Building photographs
   f. Slide illustrations
   g. Filmstrips
   h. Travel costs
2. Meetings and Conferences
   a. Public meetings
   b. Group conferences
   c. Brochures
   d. Newspaper notices

Selection of Planning Personnel

1. Conference Expenses
2. Travel Expenses

Educational Consultants' Services

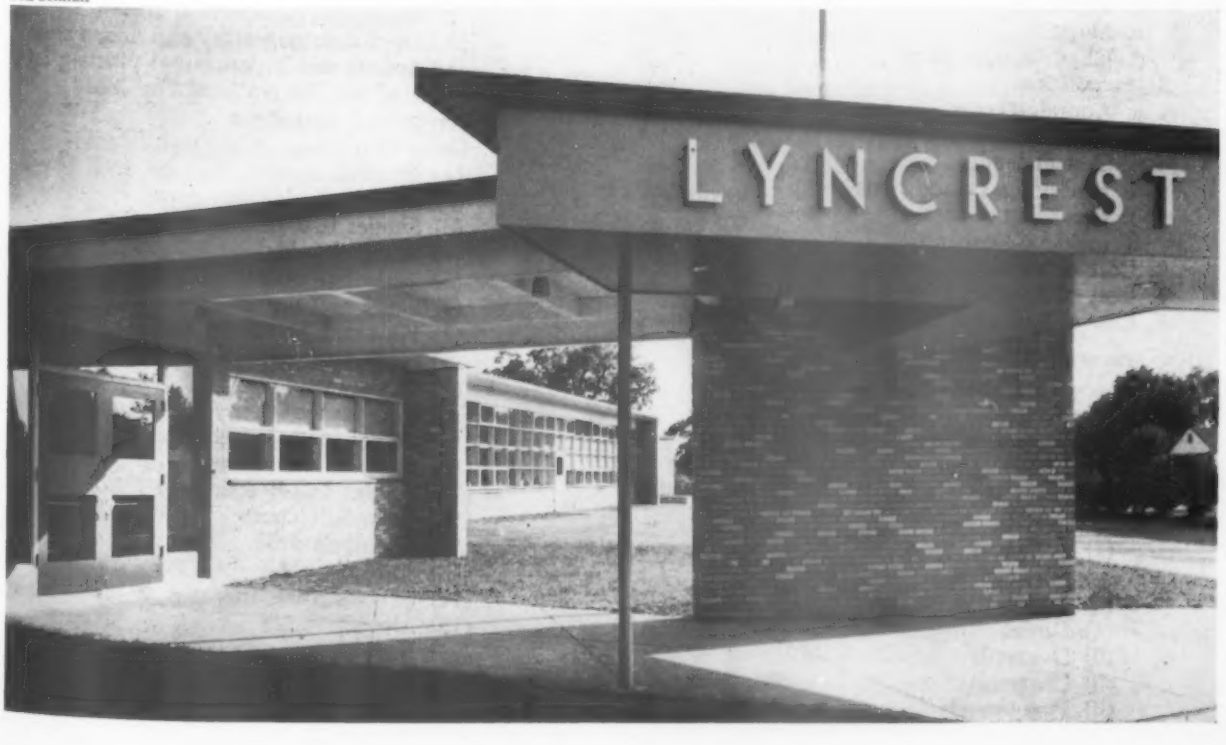
1. Contractual Agreement on Site Selection and Building Planning Construction
2. Conferences with Professional and Lay Groups
3. Additional Copies of Educational and Community Requirements
4. Slides of Layouts and Plans

Architectural Services

1. Contractual Agreement
2. Travel Costs
3. Additional Copies of Working Drawings
4. Costs of Models
5. Brochures
6. Cost of Services beyond Contract
7. Special Engineering Consultation
8. Additional Fees Fixed by Arbitration

Budget itemizing for new schools will vary with different financing methods. Each new school represents a different planning process. The Lyncrest School in Fair Lawn, New Jersey, was designed by Arthur Rigolo, architect.

Ben Schnall





General Pictures Co.

A new school for Hillsdale, Michigan, is the Samuel J. Gier Elementary School, designed by Warren S. Holmes Co.

Engineering Services

1. Contractual Costs
2. Travel Costs
3. Additional Copies of Working Drawings
4. Cost of Services beyond Contract
5. Additional Fees Fixed by Arbitration

Land Planning Consultants

1. Contractual Costs
2. Models
3. Blueprints
4. Cost of Services beyond Control
5. Additional Fees Fixed by Arbitration

Site Selection and Acquisition

1. Study and Selection
   a. Publicity material
   b. Public meetings
   c. Maps
   d. Charts and diagrams
2. Acquisition
   a. Appraisal costs
   b. Title search
   c. Cost of land
   d. Real estate commissions
   e. Recording of deed
   f. Incidental expenses
3. Cost of Land Condemnation
4. Cost of Acquisition of Land Gifts
5. Cost of Sale of Abandoned Land and Buildings

Site Preparation

1. Topographical Survey
2. Test Drilling
3. Improvement of Site Before Building
   a. Removal of trees
   b. Removal of topsoil
   c. Excavating
      (1) Basement
      (2) Footings
      (3) Areas
      (4) Drains
      (5) Dry wells
      (6) Cesspools
      (7) Pipe tunnels
   d. Filling
   e. Grading
4. Improvement of Site after Building Completion
   a. Blueprint of landscape survey
   b. Drives
   c. Sidewalks
   d. Parking areas
   e. Landscaping
      (1) Blasting
      (2) Plowing and grading
      (3) Planting of shrubbery
      (4) Layout of gardens
      (5) Trees
      (6) Seeding
5. Site Educational Facilities
   a. Flagpole
   b. Out-of-door educational provisions
      (1) Out-of-door instructional areas
      (2) Out-of-door pageantry and drama areas
      (3) Gardens and experimental planting areas
6. Playground and Recreational Facilities
   a. Playground equipment
   b. Game provisions
      (1) Football areas
      (2) Doubles badminton courts
      (3) Singles badminton courts
      (4) Baseball fields
      (5) Basketball courts
      (6) Clock golf course
      (7) Four-wall handball courts
      (8) Single-wall handball courts
      (9) Hockey field
      (10) Rink for ice hockey and skating
      (11) Soccer football field
      (12) Doubles tennis court
      (13) Singles tennis court
      (14) Volleyball court
      (15) Speedball field
      (16) Softball field
      (17) Roller skating area
      (18) Archery range
      (19) Horseshoe courts
      (20) Croquet field
      (21) Six-man football field

7. Transportation and Site Service Provisions
   a. Bus garage
   b. Automobile driveways
   c. Bicycle approaches
   d. Fuel, garbage and supply service drives
   e. Bus loading and unloading areas
8. Scouting Installations
9. Other Site Provisions
   a. Drainage
   b. Fencing
   c. Retaining walls and embankments
   d. Water provisions
   e. Miscellaneous

Building Construction Costs

1. General Construction Contract
2. Heating and Ventilating Contract
3. Plumbing Contract
4. Electrical Contract
5. Painting Contract
6. Site Preparation and Landscaping Contract
7. Elevator Contract
8. Other Building Contracts
9. Extra Costs beyond Original Contracts as Approved by the Board of Education
   a. General construction
   b. Heating and ventilating
   c. Plumbing
   d. Electrical work
   e. Painting
   f. Site and landscaping
   g. Elevator
   h. Other building contracts

Furniture and Equipment Selection and Purchase

1. Educational Consultants' Contract
2. Conferences
3. Preparation and Reproduction of Specifications
   a. Layout costs
   b. Reproduction of displays
4. Cost of Furniture and Equipment
   a. Elementary school
      (1) Classroom furniture
      (2) Administrative furniture
      (3) Playroom equipment
      (4) Janitor equipment
      (5) Health equipment
      (6) Lunchroom equipment
      (7) Special room equipment
      (8) Library equipment
      (9) Rest room equipment
      (10) Fire extinguishers
      (11) Auditorium equipment
      (12) Wardrobes
      (13) Kindergarten equipment
      (14) Visual instruction equipment
      (15) Toilet room accessories
      (16) Safety patrol room
      (17) Supply rooms
      (18) Other equipment
   b. Junior high school
      (1) Academic classroom furniture
      (2) Administrative furniture
      (3) Gymnasium equipment
      (4) Guidance equipment
      (5) Business education equipment
      (6) Attendance office equipment
      (7) Health equipment
      (8) Lunchroom furniture
      (9) Kitchen equipment
      (10) Special groups room equipment
      (11) Library equipment
      (12) Music areas equipment
      (13) Homemaking arts equipment
      (14) Industrial arts equipment
      (15) Fine arts equipment
      (16) Physical science equipment
      (17) Rest room equipment
      (18) Fire extinguishers
      (19) Auditorium equipment
      (20) Swimming pool equipment
      (21) Visual instruction equipment
      (22) Student service equipment
      (23) Teacher service equipment
      (24) Student toilet room accessories
      (25) Building service equipment
      (26) Radio and television equipment
   c. Senior high school
      (1) Social studies equipment
      (2) English classroom furniture
      (3) Speech and drama equipment
      (4) Radio workshop suite equipment
      (5) Audio-visual center equipment
      (6) Foreign language room furniture
      (7) Mathematics room equipment
      (8) Special education equipment
      (9) Homemaking education furniture
      (10) Music equipment
      (11) Physical science equipment
      (12) Business education equipment
      (13) Industrial arts equipment
      (14) Library equipment
      (15) Auditorium equipment
      (16) Cafeteria equipment
      (17) Physical and health education equipment
      (18) Administrative furniture
      (19) Attendance unit equipment
      (20) Guidance equipment
      (21) Health suite equipment
      (22) Teachers' rooms equipment
      (23) Student activity rooms equipment
      (24) Swimming pool equipment
      (25) Fire extinguishers
      (26) Student toilet room accessories
      (27) Building service equipment
      (28) Rest room equipment

Administration and Control of School Bond Issues

1. Cost of Public Meetings
   a. Newspaper advertising
   b. Ballots
   c. Printing
   d. Rentals
   e. Salaries
   f. Other costs
2. Sale of Bonds
   a. Bonding prospectus
   b. Advertising
3. Printing of Bonds
   a. Incidental expenses
   b. Seal
   c. Delivery of bonds
4. Security of Funds Received from Sale of Bonds
   a. Depositories selected
   b. Bonding of officials
   c. Insurance of funds

Administration Costs of the School Building Program

1. Administrative Costs
   a. Personnel
   b. Office equipment and materials
   c. Office service charges
   d. Telephone and telegraph
   e. Transportation
   f. Official meetings
   g. Budgeting
   h. Checking requisitions for building payments
   i. Accounting
   j. Payment of requisitions
2. Supervisory Costs
   a. Clerk of the works
   b. Chemical, mechanical, geological or other subsoil tests
3. Furniture and Construction Material Display
   a. Express and drayage
   b. Labor and materials
4. Arbitration Costs
5. Building and Contract Letting
   a. Advertising
   b. Clerical services
   c. Meeting costs
   d. Publicity

Legal Services

1. Preparation of Advertising Announcements
2. Safeguarding Site Transactions
   a. Search of title
   b. Options and their follow-up
   c. Deals of property acquired
3. Bond Issue Legality
   a. Board of Education attorney fees
   b. Bonding attorney fees
4. Performance Bonds
   a. General contractor
   b. Electrical contractor
   c. Heating and ventilating contractor
   d. Plumbing contractor
   e. Other contractors
5. Maintenance Bond
   a. General contractor
   b. Roof contractor
   c. Electrical contractor
   d. Heating and ventilating contractor
   e. Plumbing contractor
6. General and Special Contracts
   a. Claims of Board of Education
      (1) Damages to property
      (2) Damages by contractor
   b. Claims against Board
      (1) Damages to property
      (2) Damages by contractor
7. Equipment Bond
8. Court Cases

Insurance Costs

1. Fire Insurance on Project
2. Workmen's Compensation Insurance
3. Public Liability Insurance
4. Insurance of Funds

Dedication of Building or Buildings

1. Program Printing Costs
2. Program Participants' Expense
   a. Music
   b. Speaker
   c. Other
3. Decoration Costs
4. Plaque

Next Steps for School Systems

Each school system interested in the improvement of its school building program budget may find it advantageous to select items from this list or to add others that emerge locally. Widespread budget improvement will bring to light unit measures, percentages of fund allocations and desirable changes in administrative actions which may have been obscured or ignored.

Gains in local budgetary practices will result in real economies, wiser purchasing and more ready acceptance of proposals by the people when they are given all the facts.

UNITS OF COST FOR COMPARING SCHOOL BUILDINGS



by ALONZO J. HARRIMAN

Alonzo J. Harriman, Inc. Architects-Engineers, Auburn, Maine

Mr. Harriman received his B.S. degree from the University of Maine and his M.A. in Architecture from Harvard University. After ten years as a partner in the firm of Cooms & Harriman he established his own architectural firm. At the 1952 AASA Regional Convention in Boston Mr. Harriman received a blue ribbon for his plans for the Bar Harbor, Maine, Elementary School.



and PAUL P. WHEELER

Alonzo J. Harriman, Inc. Architects-Engineers, Auburn, Maine

Mr. Wheeler is a graduate of Bowdoin College and attended the Portland School of Fine and Applied Art. His etchings and watercolors have appeared in various art exhibits. After varied experience with architectural and advertising firms, Mr. Wheeler has been a junior designer in the Harriman firm for the past eight years.

WITH the great increase in school building construction that has taken place in recent years and the continued necessity for further expansion of our school plant has come much re-examination of the established methods of comparing building costs, particularly the reduction of total costs to a unit basis. At the outset, it should be made clear that there is no single standard method of comparing construction costs, and such units as are used are often very misleading. Cost comparison of different school buildings, even when architecturally similar, is never simple and is often impossible. Most of the commonly used unit costs can be meaningless.

Common units often used in cost comparisons of school buildings are cost per square foot of floor area, cost per cubic foot of enclosed volume of the building, cost per room and cost per pupil. The square foot and cubic foot costs are arrived at by some more or less standard method of measuring these quantities. As there can be differences in the method of computing the square or cubic contents of the building, there are also differences in what is included in construction costs. In some cases this may or may not include such items as site purchase, site development and landscaping, architect's fees and the mechanical services of plumbing, heating and electricity.

As an example, in our schools here in Maine these mechanical services run from 25 percent to 30 percent of the cost of our schools. The square and cubic costs can be significant, but must be used with judgment and knowledge of what is included. The bare statement, "so and so's school cost xxxxx dollars per square foot," can mean nothing for comparison purposes. Another example of the dangers of these units lies in such a case as a school with a pitched gable roof. This attic space would add to the cubic contents and hence reduce the cost-per-cubic-foot unit without giving one iota of additional teaching space or facility.

Cost Units Can Be Misleading

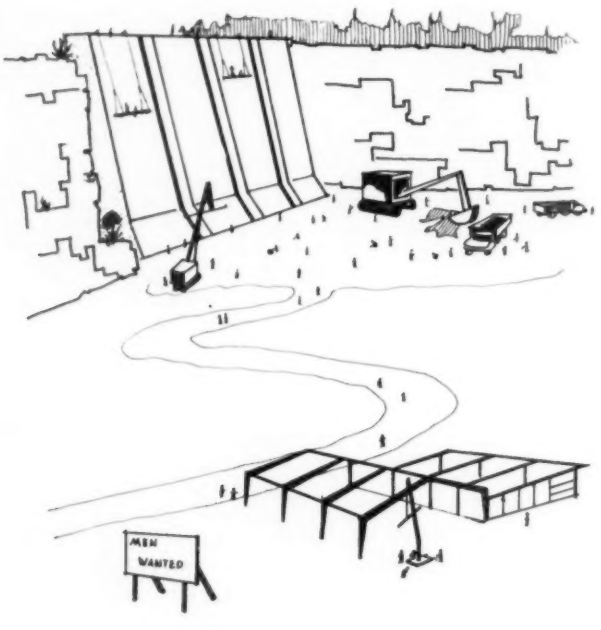
Cost units on a per room basis can be very misleading because one may be based on classrooms only and another on all rooms, including administration rooms, which can give a far different picture. The same ambiguity exists in the commonly used unit of cost per pupil in that a school can be loaded with pupils for cost purposes; *i.e.*, identical classrooms can be assumed to handle from 25 to 45 pupils as they sometimes have to, thereby nearly halving the cost per pupil figure. Also, special rooms, such as multi-purpose rooms, are given an assumed pupil count.

Figures don't lie—but have all the figures been presented? All of these units, if derived from a common base and standard, are reasonably reflective of cost variations; but without standard bases and methods they are, as mentioned above, largely meaningless and cannot be used for legitimate comparisons.

Before taking up other possible cost units that

might reduce this error, an examination of some of the cost factors—the building of *costs*, not *schools*—will be of interest to illustrate the shaky ground that a direct cost comparison of two buildings must always rest on. All that immediately follows assumes that the comparison is between two identical schools on the same site. In other words, ignoring all the architectural variables, we are still faced with a far from firm basis of comparison.

One of the big variables in this particular factor we are analyzing—call it the contractor's business—is the local supply and demand ratio for labor. Nearby construction projects, by soaking up local labor, can raise the cost of any school building in that locality. This is true also of the national market for labor, availability of materials, seasonal variation in the contractor's business, etc.



COMPETITION FOR LABOUR UPS COSTS

In addition to these factors, the influence of climate, not in the resulting design of building but the ease of building for the contractor, must be considered. This climate factor, of course, breaks down into both a geographical constant and a seasonal variable factor. All of these and more will influence, rather directly, the contractor's bid regardless of the architectural design.

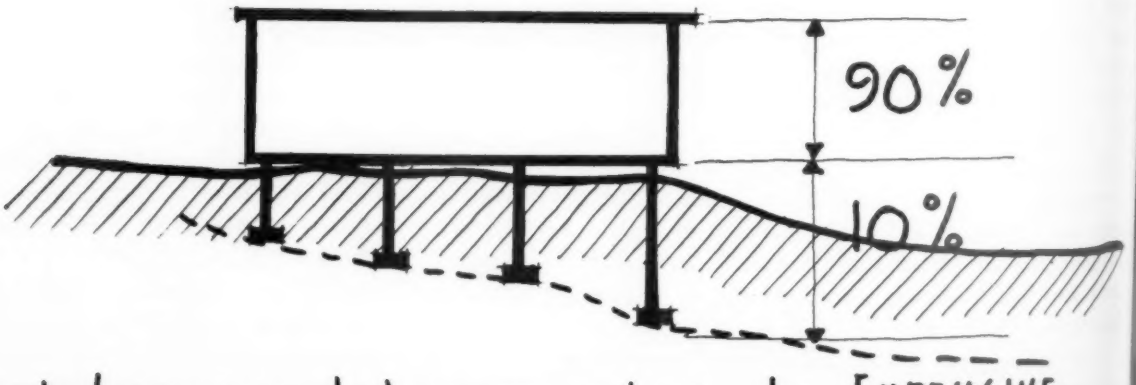
As with so much of our problem in this paper, the central difficulty is that while we can talk about these things qualitatively, no one can put quantitative figures to them. The basic data are too elusive, the cost accounting too meager, to ever amass a significant measure of the qualitative but definite factors affecting cost.

Architectural Variables

In considering the architectural aspects of this problem the ground becomes little, if any, firmer. The site might well be the first of these architectural variables. It is a truism that the site topography will influence the cost of a building but it is not realized to what an extent.

Recently our office undertook a detailed cost comparison of three of our schools; two of these were built at the same time by the same contractor, within 150 miles of each other. One had a nearly ideal site; the other, despite grade difference and ledge rock, was by no means impossible. Our analysis was done so that we were able to group all costs that varied by site conditions, and compare them. Although there is a possibility that some factors attributable to site conditions escaped us, we feel reasonably sure of our figures.

section of classroom on pile foundations



what happens below ground can be EXPENSIVE

IT

It was surprising to us that the site made so much difference and varied as much as it did—from 11 percent to 15 percent of the total building cost.

Also affecting site costs are the nearness of electric and water utilities and subsoil conditions. Recently we did plans for a school where the bid analysis showed that nearly 10 percent of the total building cost went into pile foundations alone, due to poor bearing subsoil. Another factor to be considered is whether the lot is bare of trees and obstructions, old buildings, etc. All these can affect the building cost and make comparison extremely difficult.

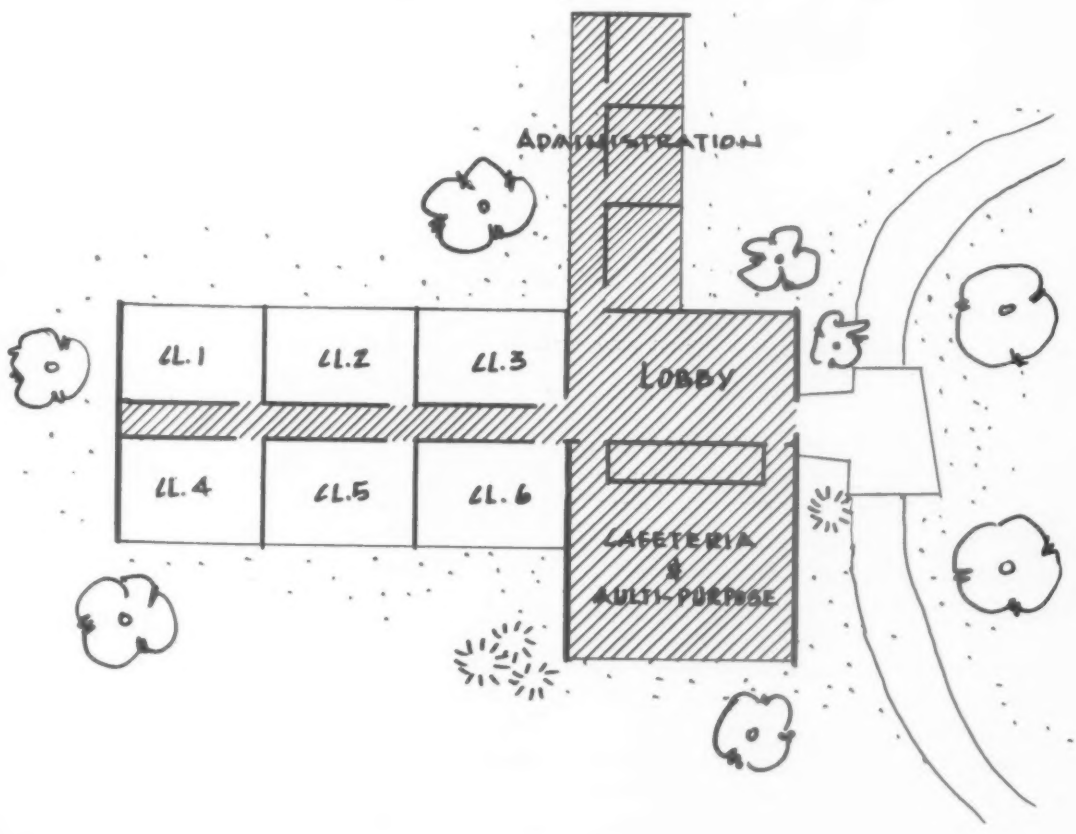
Design Economies

The subject of architectural design of the building proper is, of course, of much too wide a scope to more than touch upon here. Economies can be effected by proper architectural design and use of materials, and many studies have been published on this facet of the school building problem. Certain fundamental techniques have been well established to achieve economical schools.

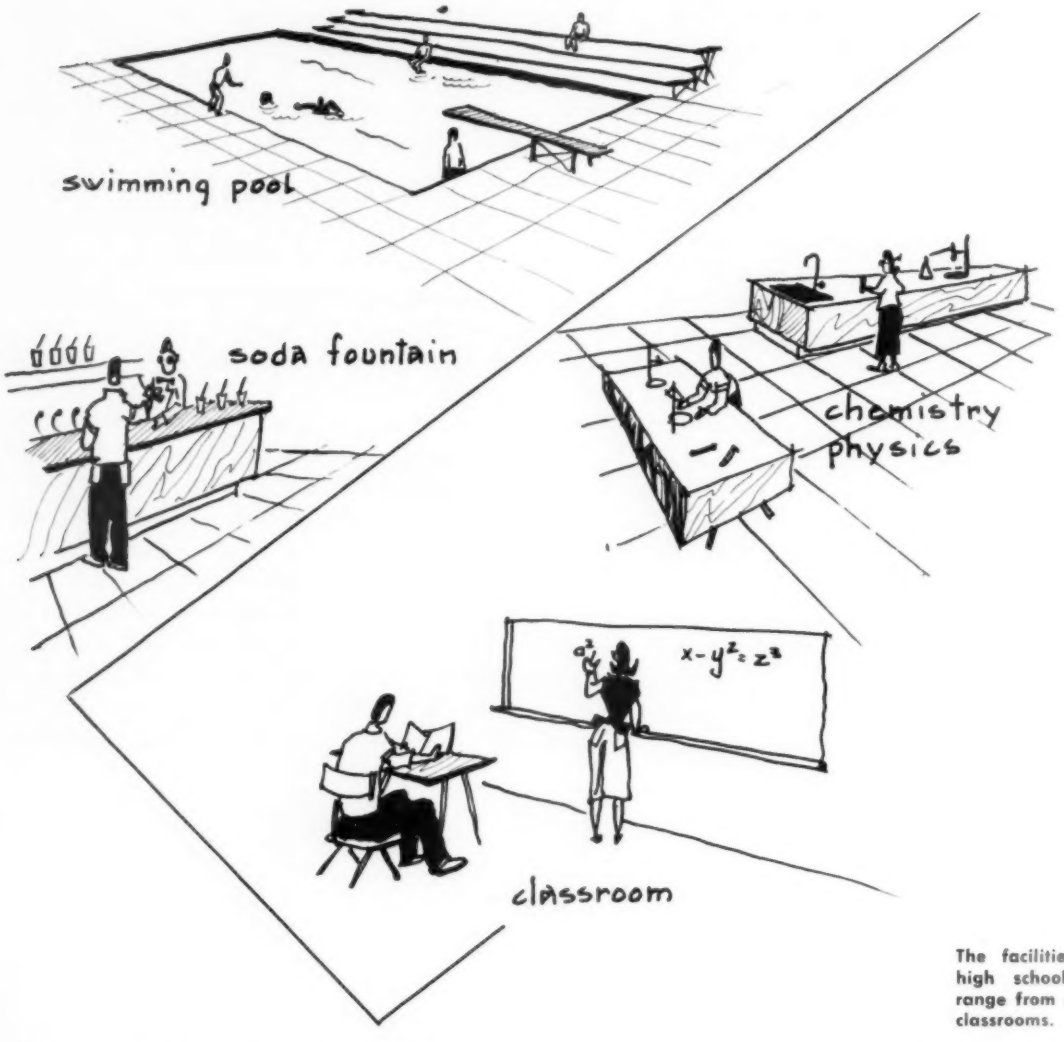
A pitfall that can distort our thinking is that of what might be called the calculus of percentage savings. For example, Window A is 25 percent less than Window B, but the windows, even B type, only amount to about 5 percent or less of the building cost. No magic material or method can achieve economical schools, only an accretion of many small economies.

The Chief Problem

The chief problem, from a comparison point of view, is that of standards of construction that will assure nearly equivalent buildings in materials and workmanship. In California, the architects and school authorities have jointly set up a detailed outline for cost accounting and comparison purposes. This divides schools into three classes from a construction point of view, both materials and methods: Group A—fire-resistive; Group B—moderately fire-resistive; Group C—least fire-resistive. These three groups are specified quite completely as to the materials and structure of the building. A standard method of measuring areas and volume is specified, as well as a voluminous manual to assist in allocating costs of parts of the work to nearly 50 separate items. From such a method, when followed for many schools, will come cost unit data that will be significant and meaningful, from an architectural point



IT IS STILL CLASSROOM AREA HOWEVER, THAT WE ARE BASICALLY AFTER IN SCHOOLS



The facilities included in the high schools of today may range from swimming pools to classrooms.

of view and only for California. That data cannot be applied to other areas, however, nor will it take account of the contractor's business variables previously mentioned.

Classroom Area Per Pupil

Some consideration must also be given to the efficiency of the school design as expressed by the classroom area per pupil. Some schools can be very inefficient in this respect with administration, janitorial service rooms, too ample heater rooms, excess corridor area, lobbys, etc., all of which, although they are necessary or create a pleasant environment, do reduce the efficiency as defined above. It is still classroom area, however, that we are basically after in our schools.

Closely related to this is the variable *educational standard*, the extent of facilities provided. The obvious example might be an attempt to compare a secondary school with an elementary school, which cannot be done with legitimate conclusions as to relative economy. But even in similar grade-level schools, classroom sizes vary. There is a great difference between schools in the amount of extra curriculum space and even more in extra space used by both school and community, such as auditoriums, gymnasiums, small classroom meeting rooms, etc. These variations will obviously affect greatly the unit costs, whether based on area, volume, classroom units, pupils or any other established base. This aspect of the cost picture, which must be accounted for in any cost comparison, will vary greatly in geographical factors, community wealth and progressiveness of school supervisors.

It is apparent that the devising of comparative unit costs for schoolhouse construction is fraught with difficulties and, in the final result, is often of doubtful meaning due to the many indeterminate variables. Some of these we find are of a quantitative nature, provided our basic data is complete enough, but some are almost completely qualitative and intangible.

Reducing the Variables

What can we do to reduce these variables? Can any basis be found for a unit-cost comparison that is any more valid than what we now use? Elimination of variables is, of course, one of the obvious means of increasing our ability to arrive at comparisons.

By classification schemes we can reduce these variables in different ways. We can make classifications of use and grade level. In this way we start to eliminate the variables of widely different facilities, such as science laboratories, where they would distort the cost picture. But even with this simplification we must expect a great difference among schools, all the way from a bare high school with classrooms and a meager science lab and shop, to a deluxe school complete with swimming pool and soda fountain. Obviously, classifications merely by education level are not sufficient.

Another approach to classification, and a more architectural one perhaps, is that of type of construction, as in the California method described above. As shown, this method divides all schools into three classes—fire-resistive, semi-resistive and combustible—with rigorous standards for each class. This is fine, and yet, what of the building which for some reason is of mixed construction by these standards? That such a building will be built and for good reason, never doubt, but where does it fit such a cost analysis?

Geographical Location

One very important classification scheme ignored so far is that of geographical location with particular reference to climate. This factor of climate, in any comparison that covers much area geographically, can



The factors of climate and geographical location are very important considerations when computing the costs of school buildings. A harsh climate will require added expenditures for costly construction features.

be tremendously important. In cost data compiled by the Office of Education under the Controlled Materials Program of the Federal Govern.. at, we find that southern schools averaged nearly 30 percent less cost than other parts of the country, in large measure due to a climate that is favorable to economical building, particularly in foundations and heating costs. That this is perhaps influenced by a community wealth status is indicated by the lack of a corresponding low cost school average in other similar climates, such as parts of California and Texas.

Severe Climate Adds Costs

But in a severe climate many cost-increasing factors are automatically added to the building–foundations that extend nearly 40 percent of the story height below ground, double glazing, large and costly heating systems–to cite only a very few of the architectural homages that must be paid to an implacable climate.

Similar cost-raising factors, of course, also are incurred in areas with too much heat as in parts of the Middle West. Their problem is need for ventilation and comfort cooling by natural or artificial methods.

From the above, certain aspects can perhaps be clear. It is now obvious that the usual methods of cost comparisons and the units used are much more complex than might be thought at first; that they can all too often be without any valid meaning or, worse, deliberately deceitful; and that to be properly significant such unit costs must have many bases and assumptions clearly stated.

A great improvement is made on the unit costs discussed if they become what might be called "second term" units–for example, cost per pupil area and other derived units. This involves first finding the area per pupil and using this as the divisor in the unit cost equation. Such a unit specifically would indicate overly spacious schools but would do little to weigh adequately all the other factors discussed above. The same objections and advantages would hold for a cubic foot comparison similarly devised.

But it is our belief that it will only be upon the adoption and use of a far more complex quotient, a much more elaborate formula, an index number similar to cost of living indexes and others, that we will begin to arrive at a significant and trustworthy cost comparison of schools.

Defining the Index Figure

Such an index figure, with the various intangibles suitably weighed, would have to be the joint labor of the three professions involved–educators, architects and contractors. From the educators would come a point system of evaluating schools from the standpoint of facilities and equipment; *i.e.*, how much is a swimming pool worth in education? From the architect would come classifications of construction and materials, evaluation of design, site conditions. The contractor would add factors of effect of labor or material shortage, climate as it affects building ease and others.

All of these many influences of cost would need to be very completely and rigorously defined and specified, of course, and applied to a large number of schools and localities. The index with its breakdown would tell us the quality of a school from educational and architectural views, any unusual economic factors from the contractor's view, as well as cost, and would make comparisons with other schools of similar or different quality possible, while enabling us to know what we are comparing, which is not the case today.

This index can only come from a high level with much committee work by representatives from, for example, the American Association of School Administrators, the American Institute of Architects and the Association of General Contractors, or similar national associations.

Brant Studio



Selecting the architect is an important step in the process of providing a new school building. Shown here is the Clyde Hill Elementary School in Bellevue, Washington. Naramore, Bain, Brady and Johnson, architects.

CONSIDERATIONS IN SELECTING A SCHOOL ARCHITECT



by HAROLD SILVERTHORN

Consultant in School Building Facilities, State Department of Public Instruction, Olympia, Washington

Harold Silverthorn received his public school education in Indiana. He has an M.A. degree from Teachers College, Columbia University and has continued his graduate work at Columbia and New York Universities. Mr. Silverthorn was a high school and college teacher in Pennsylvania, New Jersey and New York before entering the field of school business management. As a consultant he has worked with many school districts and architectural firms in planning school facilities.

THE process of selecting a school architect is extremely important whether the school district is selecting an architect for the first time or is deciding on an architect from among those who have previously constructed buildings for the district.

The method used in the selection has become a fairly routine procedure in most parts of the country. Many deviations from the basic pattern may be found, but in general it is done in this way. A group of architects is invited to be interviewed. The superintendent of schools, school business manager, school advisory committee or board of education interviews the applicants. The next step is a screening process whereby the number of architects considered is reduced to two or three. In some districts a questionnaire is filled out by the architects. In many school districts the school board visits new school buildings to see those which have been constructed by the applicant architects. In some places letters are solicited from clients of the applicant architect.

Screening the Applicants

A questionnaire, sent to various representative school districts in the State of Washington, indicated that two-thirds of the school districts interviewed a selected group of architects. The screening process is performed by the superintendent, school board or, in some instances, by a group of advisory committee members. One-third of the school boards interviewed all of the applicants. All districts visited new buildings of the architects. Participating in the visits to new buildings were the school administrator, teachers, school board and, sometimes, a representative of the school advisory committee. Half of the school districts responding to the study indicated they wrote letters to former clients of the applicant architects. Only a small percentage of the

school districts requested architects to fill out a questionnaire.

Criticisms of the Basic Approach

Some of the criticisms of the presently-used method in selecting the architect are as follows:

1. The school boards have no definite plans for securing data from the architect.
2. The board allows itself to be influenced more by salesmanship on the part of the applicant architect than by other considerations.
3. The school board is influenced by local factors.
4. The school board has already decided, before the interviews with architects, on the person to be selected.
5. The selection of the architect is not always on the basis of merit or of past achievements.
6. The board of education has not produced criteria to be followed in the selection.
7. The architects are not given sufficient time to present their cases to the board.

Perhaps the above criticisms are not valid. However, the fact that there is criticism of the procedures in selecting an architect is an indication that not all aspects of the school building program are based on the secure foundation of reliable data or proper procedure.

Mass Interviewing of Architects

In the opinion of many people who have observed this process of interviewing a number of architects, it is not a satisfactory method of selection. It is obvious that it is impossible for any group of school board members, no matter how intelligent they may be or how fine a background they may have in the selection of personnel, to interview an individual for ten minutes or two hours and get anything but a general idea of the person or his competencies. Moreover, it is impossible for the most capable architects to make a good presentation in the time allowed. Architects are a cross-section of our population and have normal difficulties in presenting their ideas before a group.

It is impossible for some architects to make a clear presentation that would enable a board to come to any conclusions about their capabilities for handling a particular school construction project; although, through experience, some architects have improved the techniques of presenting their ideas. Some of the more experienced architects have made use of charts and graphs, photographs, filmstrips and slides to illustrate particular points. Others have analyzed the particular ideas and misconceptions of school board members so they concentrate on a specific item of information that may appeal to the board and make an impression. One technique is to emphasize economies they have effected in the construction of school buildings. Some architects continuously emphasize how inexpensively they can construct school buildings. Unfortunately, these architects may select some of their very lowest-cost buildings to discuss without mentioning similar structures they have built which cost 50 percent more.

Visitation of School Buildings

It is common practice in the State of Washington for school boards and advisory committees to visit new school buildings throughout the state. In my opinion it is difficult, without proper orientation, for a school board to visit a school building and come away with any valid conclusions. I have often observed a group of trained people, who specialize in school buildings, attempting to evaluate a building and, invariably, I have been reminded of the five blind men trying to size up an elephant. Some of the so-called experts are interested in particular phases of school construction. They will notice particularly the lighting or the heating plant, or the use of certain building materials, or the economy features around the building. Usually, the feature that is not observed is the educational program and the provisions made to house its particular features or requirements.

If a school building specialist may not get a comprehensive evaluation in examining a building, can a group of lay citizens come up with any conclusions about an architect's buildings that will help them select the architect? Usually, these folks who are observing a school building come away from the visitation with some opinions. In general, one can say, if the finishing materials have been carefully executed with pleasing colors, the boards will come away with a favorable reaction to the building. Outstanding design features and educational layout will go unobserved.

Unfortunately, those groups who are charged with the responsibility of selecting an architect for a school building project are searching for a standard procedure,

Ralph Burkhard is the architect of Foster Junior-Senior High School, the South Central School District, Washington.



Chas. R. Pearson

standard criteria and a standard questionnaire that would be foolproof in helping a school district select the very best architect available to design a school building. In our opinion, there will never be devised a standard process by which an architect can be selected for all school districts or for particular jobs. The only way there can be any improvement in the method of selecting an architect is for each school district to consider its own peculiar needs and to devise ways of approaching this problem in its own community.

Some Helpful Considerations

The following outline gives a general idea of the variety of activities carried on in an architect's office:

I. Operations
- Contact work
- Design
- Drafting
- Specification writing
- Color specialist
- Detail selection and approval (hardware, door schedules, etc.)

II. Business
- Office manager
- Bookkeeping
- Contract work
- Estimating
- Filing
- Coordinating
- Production detail
- Approval of forms (State and Federal)
- Approval of preliminary and final plans
- Bid openings
- Bid tabulations
- Contracting
- Legal supervision

III. Supervision
- Head supervisor
- Inspectors
- Engineers with construction experience

IV. Engineering
- Structural
- Electrical
- Mechanical
- Acoustical
- Civil
- Testing laboratory
- Testing material (Instruction)

If one were to study the organization of an architect's office, he would find all these activities, whether the office has one person or a staff of a hundred specialists. There are many questions about the organization of the architect's office which may affect the quality of the work turned out. The following is a list of some of the questions a school board may feel are particularly important in relationship to this problem:

(1) Does the architect's office specialize in school work? (2) Does the architect's office have a general practice and, if so, what percent of his work is devoted to school buildings? (3) Is there a nucleus in the office that specializes in school work? (4) How is the work carried on through the office? Is the head of the firm the contact man? (5) Does the office have crew chiefs who take over the design of the building and act as contact and planning consultants with the school district? (6) Does the school district have any part in the selection of the particular crew chief assigned to a project? Does the office have one chief designer who checks and controls the design of all buildings? (7) Does the firm tend to reproduce the same general type of building for each project? Is each building produced by the architectural firm different and adapted to the peculiar needs of a particular community and educational program? (8) How much of the production of plans is done within the office itself and how much of the work is farmed out? (9) What particular phases of production work are farmed out and to whom? (10) What is the policy of the firm regarding supervision of construction work? Does the architectural firm have its own construction supervisors? Is there a full-time supervisor assigned to a job? Have the former clients of the school district been satisfied with the supervision given by the architectural firm?

It is obvious to anyone considering the internal organization of an architectural firm that an architect



Window walls highlight the Maple Lawn Elementary School in Sumner, Washington. Lee, Pierson and Richards are the architects.

is not one person but that he represents many people who will produce plans for a building. The architect or his firm is not only a creative artist, he is a businessman, designer, engineer, salesman, educator, public relations man, lawyer, specifications writer, draftsman, estimator and construction supervisor.

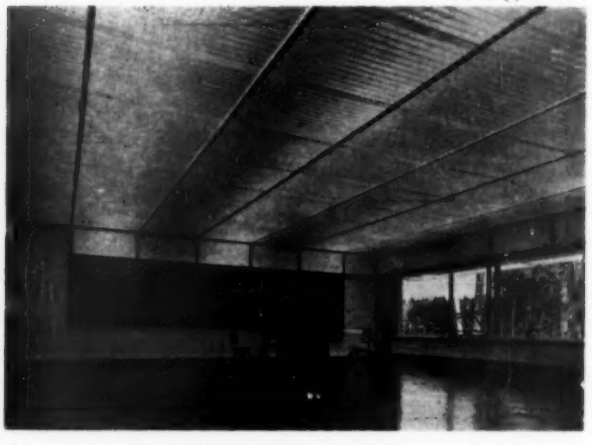
Certain criteria regarding this aspect of the problem should be evolved. These questions should be investigated: Does the architect work well with people? Does he exhibit sufficient leadership to enable him to get along well with his own organization and also work cooperatively with people in a community to plan a new school building? Does the architect or architectural firm have respect for research and the application of new ideas and materials to a school building?

Does the architectural firm run an authoritarian organization whereby one person keeps the entire office under his thumb? Under this situation, designers will be reduced to draftsmen and draftsmen will be mere slaves to a particular drafting assignment; all creativeness is wiped out of the general organization. In some offices, the designers are merely draftsmen who are assigned to detailing one particular part of a building on one job after another. For example, I know of



The AIA 1954 meeting in Boston gave a National Merit Award to the Lakeview School, Mercer Island, Washington. Bassetti, Morse and Aitken are the architects.

Art Hupy Photos



Classrooms in the Lakeview School have luminous ceilings. Windows have outside louvers for protection from sun glare.

one "designer" who for ten years did nothing but detail toilet rooms in school buildings. At heart, this person was creative and the repetitiveness of the job served to reduce him to an automaton.

In some large architectural offices designers are given an opportunity and encouraged to take particular interest and responsibility in the overall design of a building. They also take responsibility for preliminary planning, working with the school districts on the educational specifications and following the job through, even to supervising construction. The effect produced when designers are given freedom in approaching school design problems is truly amazing.

The Roles of the Principals Involved

In my judgment, a matter that is more important than the creating of criteria for the selection of architects is the definition of the role of each of the principals in a school building program. This will do more to assist in the selection of the architect and will result in the production of better designed buildings to house an educational program than any other factor. Here are some of the important points on which there must be complete understanding with the school administration and with the architect before any selection is made or any contracts are signed.

Role of the Architect

It seems to me the architect should understand his role in the preliminary planning process, how much time he is to devote to the cooperative planning process, with whom he is to work and what he will be expected to produce. He should understand the scope of the project and the time he will be expected to devote to construction supervision. All of this detail should be completely outlined with the assistance of the architect. The architect should understand that he may be expected to change his ideas on certain principles, particularly in regard to educational layout, on which the administration and school board shall have final authority.

The architect should be aware of the educational implications in the design of the building, however. It should be understood by all concerned that the final legal responsibility on all decisions is that of the school board. The architect should understand his role of working with the superintendent and teachers in evolving education specifications. He is to produce estimates of cost, supervise construction, prepare work progress reports, produce preliminary and final plans, open bids, negotiate contracts, select material and so forth.

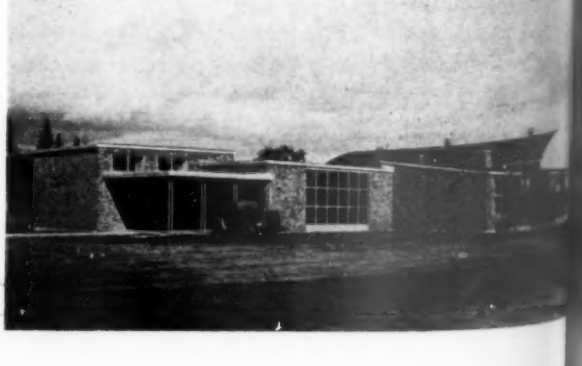
Work of the Superintendent and His Staff

They should define the educational program to be housed, furnish information to the board and the architect and do any other pertinent work.

Role of the Advisory Committee

It should be understood at the outset that the function of this particular group is advisory. The liaison function of this group should be defined. Essentially, it is to interpret what is being done in providing schoolhouse facilities for the community. It is also possible for the advisory committee to supply information to the school board on sites and cost estimates. Also, they can act as a sounding board for the type of educational program the community wants.

The new Clover Park, Washington, Junior High School is one of the many buildings rising in that state. Charles Rueger, architect



Role of the School Board

It should be clearly understood by all that the school board has the final authority in all decisions that are made. However, at the same time, the school board should recognize that they are not experts, either as educators, architects or engineers, and the functions of other groups should not be infringed upon except as the board may desire to get additional information or to ask questions regarding particular items.

Characteristics of a Good Architect

The school administration should be constantly searching for and striving to perfect its definition of a good architect. We have adapted some of Gropius' evaluations of a good architect as described on page 156 of the February, 1954, issue of *Architectural Forum*. (1) The good architect has good ideas that represent his own approach to design. (2) The good architect has the ability to design buildings to accommodate the flexible, dynamic features of modern life; he devises ways of serving human needs. (3) The good architect diagnoses the client's real needs and gives him a consistent building. (4) A good architect is competent in design, construction and economy. (5) The good architect seeks genuine regional expression. (6) The good architect has practical experience in the field, the crafts and the industrial processes. (7) He has leadership qualities to guide his client as well as the team entrusted with the job. His leadership is dependent on talent and his ingenuity of conviction and willingness to serve.

This is one outstanding architect's evaluation of the characteristics of a good architect. However, to get appreciation and understanding of these characteristics, it will be necessary for the school boards and school administrators to constantly search for them, not only in the architect but in the buildings that are produced by his leadership.

Function Plus Beauty

The one point that should never be forgotten is that it takes an unusual combination of characteristics on the part of the architect to design a school building that is not only functional but also beautiful. One should recognize the fact that it takes a skillful as well as a creative designer to produce a good building, tailored to the temperaments and desires of children. A school building should always be outstanding because it is so important to the education of children.

In the past ten years, competition has served to eliminate the poor and mediocre architects. Through the elimination process, serious mistakes made by the inefficient architect have served to eliminate him from business. Therefore, it is rare indeed to see a school board select what one might call a poor architect. Most of the architects that apply for a school building job will produce a fairly good building if they get any degree of cooperation from the school administration and community. However, most communities are not satisfied with producing just a good, run-of-the-mill building. Most school boards are making an honest attempt to recognize and appreciate the work of the outstanding architect.

It must be clearly recognized that the only way school districts can select outstanding architects is to improve their own understanding of school building needs so that they can recognize outstanding design and layout in the buildings that have been produced by outstanding architects. The only way we will enable outstanding architects to produce well designed, functional, beautiful school buildings is for the boards to increase their understanding so that they may recognize exceptional ability and the outstanding buildings our architects are capable of producing.

Architects Do Not Have the Same Qualifications

During the process of evaluating the particular competencies of various architects and architectural firms, a particular evaluation might be placed on some of the following points.

Not all architects have college degrees in architecture. Many architects have never attended college but have apprenticed themselves in an architect's office and have been licensed through serving an apprenticeship and passing an examination. Also, it is well to recognize that not all licensing laws in the states are identical.

Justin



A new school for Vancouver, Washington, is the Salmon Creek Elementary School. The building's architects are Bradbury and McCoy of that city.

Not all architects are licensed. In some states, a draftsman can set himself up as a "designer" and solicit architectural work without being a college graduate or a licensed architect.

Not all architects have the same degree of competency. Some architects and architectural firms do slipshod work. Plans are not well prepared or well planned. This shoddy work may result in higher bids on the project.

Not all architects are creative. It is generally recognized that not all architects are really creative. Some

architectural offices have reproduced time and again, with minor variations, the same general plans they have used for years.

Not all architects are construction supervisors. This point is obvious because many creative people have very little interest in construction work. Essentially, the creative artist may be interested in art and design with comparatively little interest and appreciation in mundane, workaday aspects of the world. It is generally easier for lay people to recognize good construction work than it is for them to recognize creativeness. As a result, many architectural firms have built their reputations on the careful workmanship that has gone into the production of a well built structure free from leaks and other annoying maintenance problems rather than on the quality of design.

No one architectural firm has a monopoly on ability. Many architectural firms are dependent on technical assistance. It is necessary for them to have construction supervisors, bookkeepers, draftsmen, color experts, specification writers, designers and so forth.

The evaluation of an existing building. In order that people responsible for the selection of an architect may be able to evaluate an existing building, it is important that various criteria be worked out. The following questions could be asked and studies made to enable school administrators to evaluate an existing building:

1. How well does the school building house its educational program? This evaluation, it seems, should come from classroom teachers, supervisors and school administrators.
2. Were questionable items of finish, building materials, hardware, etc., selected? If so, who made the decision? Why was the decision made? What items could be better used on the next building?
3. Would other selections of building items, such as chalkboards, cabinet work, flooring, etc., have been more efficient or useable? Who was responsible for the selection?
4. Is the building easily maintained? This question should include both housekeeping and maintenance information and should be answered from the record. Proper records should be supplied by the housekeeping and maintenance divisions so that reliable comparative data on the cost of maintenance, operation and housekeeping could be set up.
5. What are the cost data on existing buildings? Cost data, showing a breakdown of all items, square foot costs and per pupil costs, of such a type that can be compared building to building, should be kept by the local district. These cost data should not be prepared by the architect but should be compiled by the school building and accounting department.
6. How wisely has the architect made use of spaces in the building? To get the answer to this question the school district should set up area designations for all areas in the building, giving a breakdown to show the comparative use of space in all buildings constructed. Have little-used space and waste space been eliminated?
7. Has beauty been designed into the building? This very intangible point is extremely difficult to evaluate. One question that could be asked to obtain people's reactions could be this: How do students, teachers and parents react to the building from an appearance standpoint? In an elementary school the question could be: Is there a homelike atmosphere about the interior and exterior of the building? Another question is: Has any building produced by this architectural firm been given honorary merit awards by some organization that is competent to judge its aesthetic qualities?

Pertinent Points

To summarize, it seems to me the following pertinent points should be emphasized. The problem of selecting an architect is a complex undertaking. It cannot be reduced to simple solutions or a list of criteria that will be helpful to boards of education in the selection of architects.

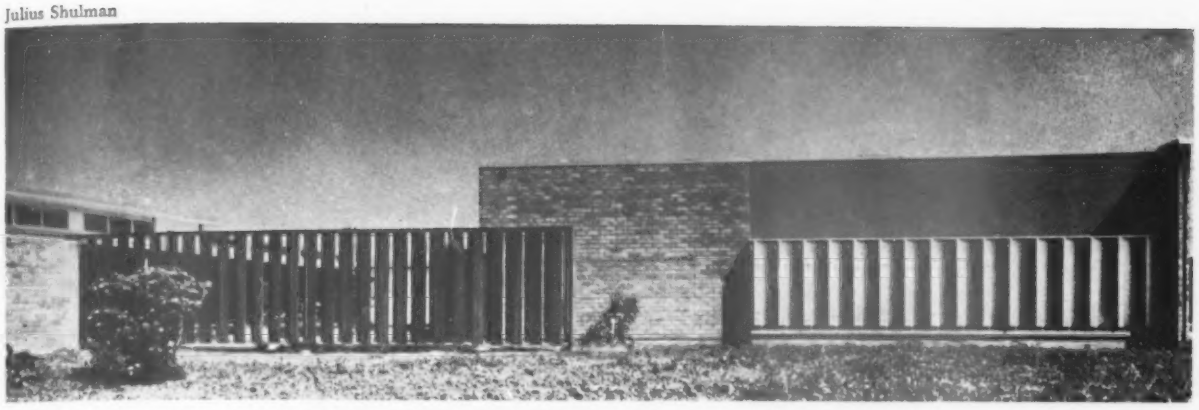
It is necessary to interpret for school boards what goes on in an architect's office. An analysis of the wide range of activities that go on in and out of an architect's office may be a key to enable school boards to get a better understanding of its operation. Architects' offices are organized differently and the organization of the office may affect the type of building that may be produced.

A wide range of abilities is necessary in an architect's office to produce a school building that is both good and beautiful. Architects are different in their capabilities and in the technical assistance they may have available, both in the office and from outside.

Only through an understanding of the role of the board of education, school officials, lay committees and architects in the production of a school building can the principal parties function to the best of their abilities in a cooperative manner and produce a building that is good and beautiful.

School boards and school administrators must educate themselves to know what is desirable in a school building in order to house a school program and to provide a pleasing atmosphere for the occupants.

Julius Shulman



View from the west of the new Business Education Building of Orange Coast College, Costa Mesa, California. Neutra and Alexander, architects. Cooperative planning helped to create this building.

AN ARCHITECT VIEWS THE CLIENT'S ROLE IN SCHOOL BUILDING PLANNING



by ROBERT E. ALEXANDER

Richard J. Neutra and Robert E. Alexander, Architects, Los Angeles, California

Mr. Alexander has practiced architecture alone and in partnerships since 1935. Prior to that he worked in various offices in Los Angeles and New York. He has also served as consultant on various government projects, and is presently a consultant for the Government of Guam. Mr. Alexander has a Bachelor of Architecture degree from Cornell University.

In contemporary society, the architect's client is seldom an individual person. In the case of school buildings it is sometimes difficult even to identify the real client. The theory is that the board of education, board of regents or board of trustees act as owners in trust for the people of a district which they represent. Yet, they, themselves, seldom use the buildings and seldom have a background knowledge of construction. The chief administrator, the superintendent of buildings and grounds, the faculty and even the students, all of whom use the buildings every day, must somehow be brought together with the trustees or policy group in a cooperative effort to represent the client, who is ultimately the people themselves.

Perhaps cooperative planning is taken for granted. As we all know, many an educational institution has been designed from a set of space requirements, presented by the department of buildings and grounds or some executive office to the architect, who has then produced the design without further reference, other than his own intuition or past experience, to the detailed activities or the philosophy behind the school. Very often his goal and the measure of his success is determined by winning the board of trustees through the presentation of pleasing sketches, without detailed reference to the activities within the buildings.

The architect is asked by a donor or by the board to show what the buildings will look "like." This expression gives itself away. Looking "like" something is not the same as being. The request presupposes a fraud or imitation of the real thing. This method of approach, of course, might be carried out brilliantly. An architect with great intuitive insight and broad experience might produce a superior design which satisfies not only the board of trustees and the public, but the faculty and students as well. We are convinced, however, that even in the rare instances when this method appears to produce satisfactory results, the institution would have gained precious advantages if cooperative planning had been employed.

Cooperative Planning Is a Search

Cooperative planning is an honest search for the truth in building. The process itself is even more im-



The merchandising laboratory of the Business Education Building at Orange Coast College has a variety of display cases and windows to accommodate the class projects.



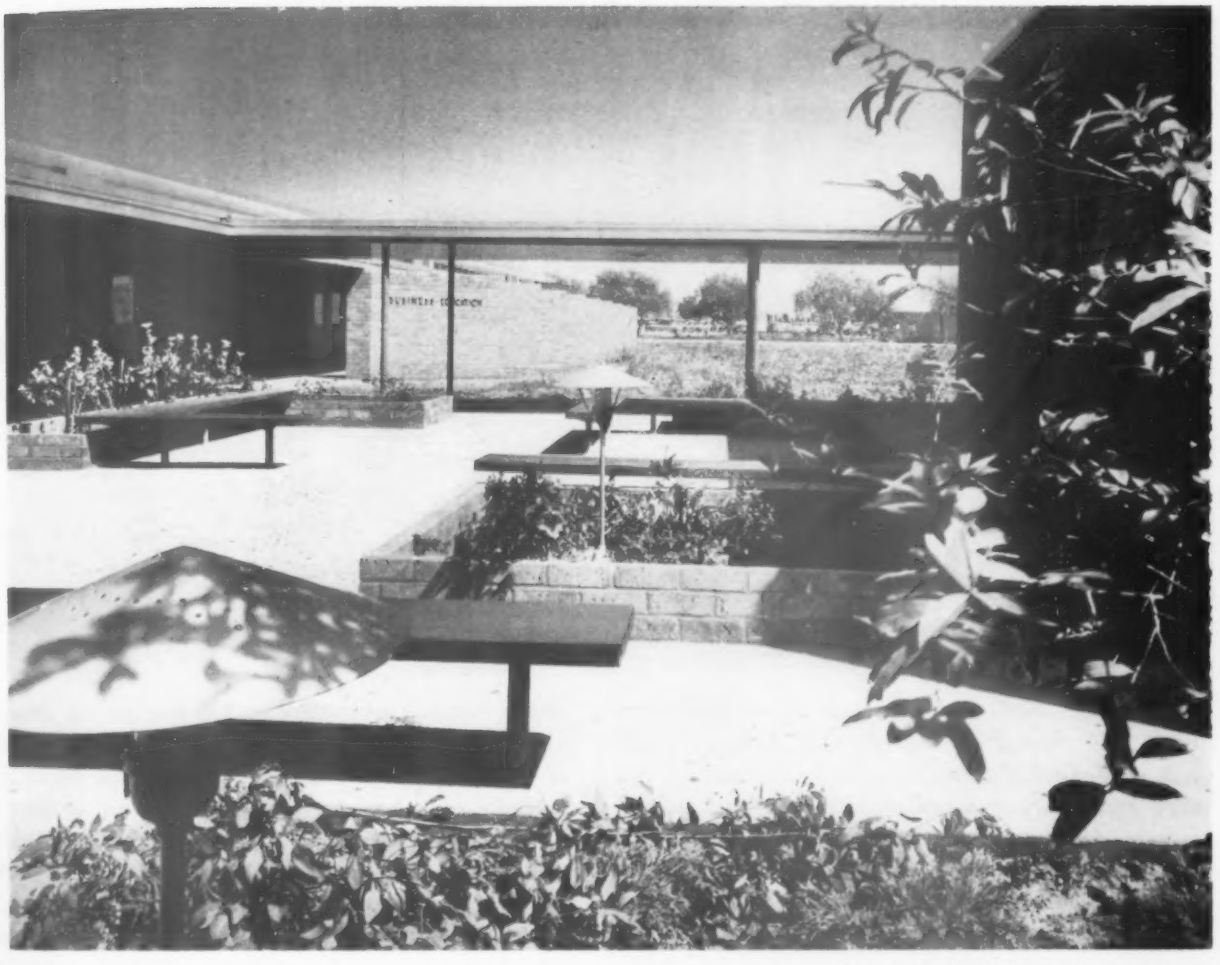
The secretarial laboratory has a switchboard and different types of office machines. A sliding partition at the front of the room separates the duplicating machines area.

portant than the building it produces. When conducted properly, it gives the many people who will occupy and use the buildings a real sense of participation, ownership and pride in the product. It fails in this, of course, if the faculty and students involved treat it merely as a necessary chore to which they are asked to devote extra hours without compensation.

When the buildings are finished, occupied and used, every instructor should feel that he at least had a voice in planning decisions. A new faculty member, coming years later, should still feel the effects of faculty solidarity and general satisfaction. He should be able to see that these are buildings in which the users themselves, that is, the real clients, had something to say which was heard and heeded.

As architects, our main professional satisfaction is derived mostly after the buildings have come to life and are found to suit their purpose better than anyone could have dreamed. Where the analysis of methods, activities and curriculum comes first and the design comes second, flowing out of them, we are convinced that we stand a fine chance of success. An investment, on the part of a faculty member, of a few hours of time in cooperative planning may easily save him and his successors countless hours and headaches in the years to come.

Assuming that cooperative planning takes place, the client's functions might be divided into two categories. One, usually handled by the policy board or by a buildings and grounds committee of the board, would include the decisions which establish aims and objectives. The second is to define the educational program and to begin the building plans. This is best handled by a building committee, composed largely of faculty members, the chief administrator and at least one member of the policy board. Invaluable guidance throughout the entire planning process is sometimes furnished by an educational consultant.



The courtyard of the Business Education Building is a pleasant outdoor area with benches placed near the planting sections.

In addition to the board members, the chief administrator, the superintendents of business and buildings and grounds and the leaders in education or deans can help to establish the client's aims and objectives. We have also found it highly desirable to include one or more students on the building committee, especially when such buildings as the student center, the auditorium, the gymnasium or any general use buildings are being considered. Buildings and grounds should also be represented on every building committee, unless there is a separate group which reviews plans.

Define Fundamental Aims

It has been found that the definition of fundamental aims of a building program is often neglected. One of the most important of these neglected items is the quantitative goal of the institution. What is the ultimate student capacity? If construction is to be accomplished in stages, what is the immediate planning goal? Either decision should be made officially and recorded as fundamental policy.

Although there is little need to involve the architect in a decision on student capacity, there is every reason for bringing him into the picture when budgets are being determined. The development of the budget should be a cooperative effort. It is quite clear that many non-architectural factors may determine a budget. The wealth of a district, the public relations policy of the board and competition for funds by other agencies must be taken into consideration. It is a frequent mistake, however, for the client to attempt to establish a building program and a fund raising plan without the full collaboration of the architect.

The most active participation of a client in the cooperative planning process comes to play in building committee meetings. Our first step, in organizing information regarding a specific building, is to distribute planning outlines to building committee members prior to the first meeting. This is a questionnaire to be filled out by individuals and designed to bring out differences of opinion before any committee discussion takes place. In addition to the questionnaire, we sometimes provide sketches of floor plans, in schematic form, of various elements of the proposed building. Although



Draw drapes close off the doors and windows of the merchandising laboratory when necessary.

this practice might result in unfortunate preconceptions, it is pointed out strongly that these are simply test plan sketches intended merely to stimulate concrete and specific suggestions, rather than general discussion. After questionnaires are distributed, we visit classrooms in session and observe the activities as they are being carried out in existing facilities.

When the questionnaires are returned, they are digested and conflicting answers are tabulated. A diagrammatic sketch is made of the proposed building, incorporating the answers to the questionnaire in notes wherever possible. Copies of the plan are distributed to committee members at the first meeting of the building committee, at which time we explain the plan and the reasons for our decisions. Discussions and criticism ensue and a record is made of decisions by the building committee. Preliminary plans are revised and presented at a subsequent committee meeting, and the process is repeated until the committee is prepared to recommend the plan to the policy board.

Planning Problems

There are several problems connected with the cooperative planning method which can be solved only by the client. Strong and wise administration is sometimes required to hold down the skyscraping ideas of one faculty member, while encouraging and stimulating the response of another. In this way a proper balance is maintained among departments or divisions of the same department. Another problem is presented by the faculty member whose ideas are so extraordinary that they might result in an inflexible space. Such a space could not be converted easily for other uses. Most educational buildings have a longer amortization period than the teacher.

Constant and careful cost estimating and reporting by the architect, backed up by strong control at the head of the committee, will sometimes be required to keep faculty requests in line with the budget established by the board. On the other hand, when budgets are established without reference to the real needs of the program, waste of funds often results.

Cooperative planning requires plenty of "blood and sweat," but we are convinced that it saves the tears. In spite of the work involved for both client and architect, or rather because of it, the system itself is intrinsically important in planning school buildings. If we wanted to raise peaches, we would hardly plant a prune pit. Cooperative planning is the systematic seed from which good buildings grow.

CONSULTATIVE SERVICES REQUIRED IN PLANNING SCHOOL BUILDINGS



by CYRIL G. SARGENT

Professor of Education and Director, Center for Field Studies, Graduate School of Education, Harvard University

Dr. Sargent has taught in high schools in Rhode Island and Massachusetts, at Massachusetts Institute of Technology and at Phillips Academy. He has held his present position at Harvard University since 1947. Dr. Sargent has A.B. and M.A. degrees from Brown University and an Ed.D. from Harvard.

and DONALD P. MITCHELL

Director, Division of Field Services and Research, and Associate Professor, School of Education, Rutgers University

Dr. Mitchell taught in the public schools of Massachusetts before serving in the U.S. Army as an infantry captain during World War II. Later he was associate director of the Center for Field Studies, Harvard University. Since 1954 Dr. Mitchell has been with Rutgers University. He holds a B.S. degree from Hyannis State Teachers College and Ed.M. and Ed.D. degrees from Harvard University.

THE question of what consultative services are required in the planning of new schools sometimes elicits the contrary one of why any consultative services at all. The question is difficult indeed, for school building situations range all the way from those which may require no such service to those demanding the services of a consultant or consultants from an initial study of school enrollments through to the development of final working drawings.

Local conditions and needs are determinant in the matter of consultative services, and it is necessary to examine and study each given building program in the light of these conditions to be able to enumerate in detail the kind and extent of services required. Moreover, the situation is a determinant not only with respect to substantive matters of analysis but also, and with equal importance, with respect to *process*. Many persons are involved in the complex process which results finally in the school building.

Frequently, the manner of proceeding and the choice of alternatives are closely related to the personalities of the individuals involved. The relationship between municipal and school officials may complicate and obscure the very goal all are working toward. Interdepartmental competition and managerial details may also play a part in pettifogging the process. In such situations the consultant's role is that of expediting the process of decision making by the local participants. These process skills are as much an important part of a consultant's kit of tools as is his technical competence. With the stress on the local real estate property taxes and the ever-increasing competitive demands for municipal and school capital programs, it cannot be over emphasized that the *manner of procedure* may in many cases largely determine the success or failure of school building programs.

To perform a *process* role, the consultant should preferably be involved in the beginning planning stages of the program. Through such involvement he may become aware of the human factors in the situation and thus be able to judge better the choice of alternatives available for moving toward the goal. It is not enough to know one's technical field in order to perform most effectively. A technical background without human sensitivity may actually defeat the effectiveness of the consultant role.

Mass of Data Needed

This emphasis on process is not meant to imply that technical background is unimportant. A properly

It is preferable that the educational consultant be involved in the early planning stages of a school building program.



Ted Polumbaum

planned and executed school building program needs a mass of data, together with expert appraisal of the significance of the data at many stages in the development of the program. At the very beginning the definition of need will depend on both quantitative and qualitative decisions regarding the size of the potential school enrollment to be housed, as well as on the type of program to be offered to children at the various grades.

As an example of the quantitative problems we would suggest that enrollment predictions are no longer possible by simply adding up a series of percentages and proceeding to make a rule-of-thumb estimate as to what the future numerical needs will be. The extrapolation of enrollment estimates has been proved to be less dependent upon a simple averaging out of recent history than upon the weighing of each of the variables,

Ted Polumbaum



Thorough analysis of community and population should be made.

birthrates, migration, drop-outs and non-public school enrollments, weighted individually and evaluated within the framework of community and larger area growth or lack of growth patterns.

No community has a right to expect the support of the taxpayers if the program requiring capital support is not based upon the most thorough population analysis possible. A preschool census is always to be desired, and assistance may be obtained from a consultant as to the best manner of procedure to arrive at thorough coverage and the extraction from the data of information on migration and other variables.

The Consultant Can Help

There are those administering school systems who feel that the use of consultants implies an administrative inadequacy on the part of the superintendent or his staff. This is clearly not the case. If one looks at industry, one sees that they continually and increasingly employ the outside consultant even with large and specialized managerial staffs, as well as in the smaller single-management operations. In the latter situation the manager is a generalist; he must perform a variety of functions; he must be continually participating in the process of organizing human behavior to achieve the goals of the organization. He cannot and should not be thought to be "an expert" in all the technical phases of the operation.

The school administrator in the smaller school system is in a similar position. He is confronted with the total gamut of problems of an educational system and its program. School buildings, their location, size, their effectiveness in providing efficient physical environments for learning, their community use, these and numerous other questions provide him with the need for detailed technical knowledge which he has not necessarily acquired by study and may not have experienced in a wide enough range of situations to wish to rely on his own information and judgment alone.

In the larger organization with its staff specialists, there is as well a place for the consultant to function. Here it is not so much the technical knowledge which is paramount, since this can be presumed to be represented in large measure by the staff; rather it is a matter of an outside viewpoint, a fresh approach, a detached or objective study or a resolution of disagreements.

Consultant Sparks the Program

The services of the consultant are, in this situation, perhaps likened to those of a catalytic agent in a chemical reaction. By his involvement in the situation, his asking of questions, his questioning of assumptions, his help in redefining problems, his participation in the analysis of consequences of decisions or proposed solutions, his suggestion of alternative courses of action, any or all of these may help to focus the actual decisions needed and facilitate action in advancing the building program.

School building plans bring sharply into focus a series of educational policy issues on which decisions must be made. A community may know that it "needs a new high school," and the immediate concern is "how big shall it be?" On examination this may be seen to be stated as, "there is need for a senior high school capacity of 2,500 in the next five years," which immediately poses such questions as, "shall it be one high school or two?" "If two, shall both be comprehensive, and how shall the buildings be located with respect to socio-economic or ethnic groupings in the community, as well as with respect to physical and man-made barriers?" "If it is to be one school, what can be done with respect to design to help the individual to keep from losing personal identity and opportunity for participation in a large administrative organization?"

At a later stage the question may be that of deciding how many classrooms, both general and special, are required for a given secondary school enrollment.

Fay Foto



The consultant can give valuable assistance in regard to where a new school plant should be located. He will guide community surveys and population analyses.

Here questions of program scheduling, departmentalization, class size, building utilization and of the range and scope of the curriculum all emerge, as well as the larger one of "whither secondary education." The consultant can raise questions on all of these matters and can thus help *crystallize the necessary decisions.*

Perhaps it would be well to emphasize that the consultant does not need to have *the* answer (there usually is more than one) and that, except where it is clearly demanded and expected that he give "the answer," he can be more useful in providing the data and technical knowledge which will help others make a better decision. There are advantages, therefore, in arranging for consultative services at such early time as to make it possible for him to participate in the process of teacher-parent-pupil-community planning of the schools. In this way, his knowledge can be maximally used.

What, then, are the required services for which an educational consultant should be used? We have answered by saying that local conditions and needs will determine, but perhaps by tracing a brief list of stages in school plant planning those services which might appropriately be asked of an educational consultant may be given. This list is given in columnar form, yet as logically it could well be circular since there is no beginning or end to some of the steps. Each is in process of continuous assessment. Each part is preceded and followed and continued by others in changing order and with varying intensity. Perhaps what we are listing are stages in planning at points of critical intensity.



The culmination of a successful planning program will be a school building which fulfills the needs of the program and the requirements of its particular community.

Harvard University News Office

Stage	*Consultative Service*
School Enrollment Prediction:	Develop the most reliable method. (Birth rates, mortality, drop-outs, migration, non-public school, sub-area analysis.)
Present Plant:	Assist in evaluating and recommending for abandonment, renovation, additions.
Determination of Educational Program with Building Implications:	Participate with staff, citizens and architect in planning educational specifications for building.
Building Needs:	Participate in the preparation of a long-range program which will detail how each step meshes with subsequent ones to prevent misplaced units, overbuilding or underbuilding, and to incorporate flexibility which will provide for a series of stages and dates for immediate needs.
Selection of Architect:	Discuss with the responsible group criteria they may wish to use—suggest schools to visit to appreciate functioning of design in relation to program and to such factors as psychological environment.
Site Selection:	Analyze population implications, barriers, availability of area, accessibility, community services, topography, local acceptability.
Preliminary Plans:	Discuss and plan with architect interpretation of educational specifications.
Final Working Drawings:	Study and analyze final plans as to educational operation and adequacy.
Public Information Program:	Advise throughout as to problems of communication and participation.

We have limited our discussion essentially to the educational consultative services required in a school building program. At times other services are also indicated; perhaps those of a city planner, of a site engineer or a specialist in bond investment, to suggest preferred methods of scheduling and timing and to indicate factors affecting market acceptability in order to secure the lowest bids. These and others can all make valuable contributions to the consummation of the objective of the best school plant possible for the children, youth and adults of the community, with the most prudent expenditure of public funds.

SCHOOL PLANT CONSULTATIVE SERVICES FOR THE LOCAL SCHOOL DISTRICT



by ROBERT L. HOPPER

Professor of Education and Director, Bureau of Research and Service, School of Education, Michigan State College, East Lansing

A graduate of North Texas State College, Dr. Hopper received his M.Ed. degree from Harvard University and his Ph.D. from New York University. Before joining the staff of Michigan State College, Dr. Hopper was director of the Bureau of School Service at the University of Kentucky and director of educational finance, New Hampshire State Department of Education.



and DONALD J. LEU

Assistant Professor of Education and School Plant Consultant, School of Education, Michigan State College

Dr. Leu is a graduate of Western Washington College of Education. He received his M.Ed. and D.Ed. degrees from Teachers College, Columbia University. Prior to his position at Michigan State College, Dr. Leu was a consultant to the New York State School Building Commission and served as an associate in the Institute of Field Studies, Teachers College, Columbia University.

In recent years there has been a mushrooming demand by local school districts for professional assistance in determining future school plant needs and in the educational planning of new school buildings. The continuing high rate of new school construction, the complexity and continual changes in today's and tomorrow's educational program, along with the frequency of past errors in planning new schools have all heightened this demand.

Unfortunately many new school buildings restrict and limit desirable program improvements. The emerging "community school" concept and the needed flexibility with which to meet tomorrow's program changes are all too frequently hampered by the building structure, itself. These factors have contributed to an increased reliance upon the services of school plant consultants who assist local school districts in the planning process.

Types of Consultants

Local communities have many consulting services available to them for assistance in developing educational plants. Most states have recognized the need for school plant services and provide consultative services in the state department of education. Local school officials may request and receive assistance in making surveys, reviewing plans, selecting sites and solving the question of modernizing or abandoning substandard facilities. Usually no charge is made for these services. In the past it has been found that there are not enough state department consultants available to serve all local needs adequately.

Many colleges and universities now provide school plant consultative services. In addition to the service functions involved, these institutions have teaching and research responsibilities. Some institutions are able to coordinate these functions, and provide intensive assistance by working with local school staffs and citizens to formulate development programs. The charge for this assistance is usually a fee to cover the expense of providing the service and of preparing a report for the board of education and community.

Architectural firms have been adding educational consultants to their staffs. The services rendered by such consultants may differ from firm to firm. In general, these consultants are available to assist local districts in studying their school needs. They interpret the educational program to the architects, and the building plans to the educational staff. Considerable controversy, however, exists over whether or not the architect's services should include assistance in determining educational needs. Normally, there is no charge for services of this type beyond the usual architectural fees.

Private consulting firms and individuals are avail-

able to render assistance to local communities. Consultants from this source are contracted to analyze school building needs and review plans in terms of the educational program. The cost of such consulting services usually includes the expenses and salaries of persons involved, or the fee established may be based upon a fixed percent of actual construction costs.

Each local board of education must first determine the services needed of school plant consultants, then the type of consultant services which will best suit its needs.

What Services Are Needed

Considerable variation exists in the amount and type of assistance needed by individual communities. These variations depend on the conditions which exist in the local school districts and the time available before new construction must be started. The superintendent, board of education, school staff and citizens will find that they need assistance with the following:

1. Determination of immediate and long-term school plant needs.
2. Estimation of future enrollments.
3. Selection of the school architect. The consultant does not and should not evaluate or recommend any architects, but may suggest to the superintendent and board of education efficient methods of interviewing, evaluating and selecting architectural firms.
4. Selection of school sites.
5. Determining whether to modernize or abandon obsolete school buildings.
6. Development of educational specifications or a program of educational and community requirements for new or modernized school plants.
7. Preparation of a tentative budget for the proposed building program.
8. Interpretation of the proposed building program and its financial implications to the community.
9. Consultation with the school staff and architect during development of the preliminary plans.
10. Development and arrangement of the various technical spaces, such as science rooms, music rooms, shops and athletic facilities.
11. Reviewing the working drawings and specifications, and suggesting to the architect and board of education any needed improvements and possible economies.
12. Counseling the board on the desirability of various alternate bids and their educational implications.



Superintendent, architect, representatives of the school staff and school plant consultant review preliminary building plans for the Rochester Public Schools, Rochester, Michigan.

13. Development of efficient methods of selecting furniture and equipment.

On the Planning Team

Superior school buildings do not just happen nor is economy in planning an accident. Sufficient time must be allowed for efficient utilization of all the human resources available in and to the district when a new school building is contemplated. The educational program must be a development of "preliminary plans." As the educational program unfolds, specific building plans become a realistic interpretation of the program. In spite of good architectural services, insufficient educational planning will result in a structure that is unable to meet the immediate or long-term educational needs of the community.

The superintendent of schools is the key person in the planning process. All others involved should channel their activities through his office. Among the human

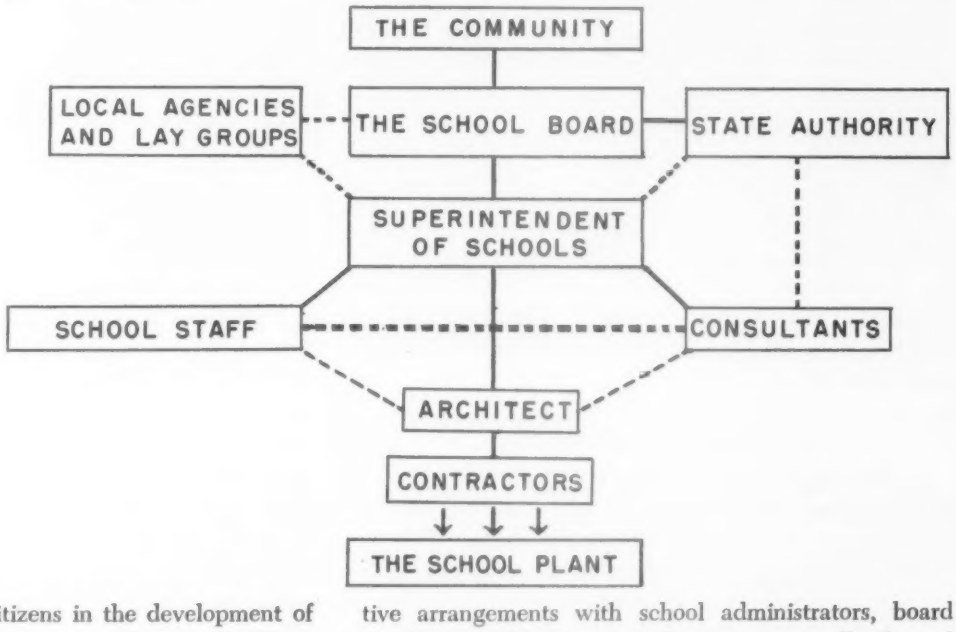
resources he should put to use are lay citizens, the administrative, teaching and custodial staffs of the district, curriculum specialists, state officials, the school plant consultant and the architect. All persons are members of the same team, playing different positions and having changing roles of importance as the planning progresses.

In working cooperatively with others involved in the building program, the school plant consultant serves in an advisory capacity and the legal responsibilities of the school board and the executive function of the school superintendent must at all times remain crystal clear. For example, a representative citizens committee is formed by the board of education to assist in studying the educational program and school plant needs. This committee secures assistance from the school staff and various specialists, including the school plant consultant. Their final report is submitted to the board of education. The board, after carefully reviewing the report, submits all or a portion of their major recommendations, involving capital expenditures, to a vote of the people.

Should new building projects be approved the school plant consultant begins working with the school staff and representative citizens in the development of "educational and community specifications." These specifications are submitted to the architect after review by the administrative staff and approval by the board. The consultant assists the architect in translating these specifications into "preliminary plans" and in reviewing these plans with citizens, teachers, custodians and administrative staff for needed changes.

Preliminary plans are then submitted to the board of education for approval. Again the school plant consultant assists the board in interpreting the educational implications embodied in the plans. The consultant renders further assistance in the development of detailed layouts for such spaces as shops, homemaking and science rooms. Finally, upon completion of the working drawings and specifications, the board again seeks assistance from the school plant consultant in reviewing the final plans and specifications prior to official approval.

Obviously, educational planning takes time, but time which will pay long-term dividends in better staff morale, better community understanding and better school buildings.



The planning process for a new school building involves the action and interaction of many participants. The diagram demonstrates the relationships of those who could take part in the planning process. Solid lines indicate lines of responsibility; dotted lines indicate cooperative planning relationships.

Additional Services

The school plant consultant should do more than assist in the planning process. He has, in fact, the threefold responsibility of service, training and research. The dissemination and evaluation of research findings should receive his careful attention.

Many school plant consultants are rendering assistance in the training of current and future school administrators through graduate course work in colleges or universities designed to help schoolmen understand and meet their long-term school housing problems.

Regional conferences or summer workshops offer another method of assistance. These may be cooperative arrangements with school administrators, board members, architects, city planners, state officials and school plant consultants working together on common school building problems.

Action research holds the greatest potential for service to local school districts. American school buildings are characterized by their individuality and experimentation. New ideas range all the way from improved chalkboards to lift-slab construction. The finger-plan, campus-plan, cluster-plan and other variations are currently the center of question and controversy. Inaccurate data and prejudiced reporting compound the confusion.

The school plant consultant, working cooperatively with others engaged in school construction, can render real service to local school districts by gathering facts and carefully evaluating controversial issues. The initiating and evaluation of school plant research should receive an increasing amount of his time. New ideas which are true educational improvements should be brought to the attention of all school districts. Likewise, local communities should be cautioned against the many pseudo-research findings currently being advanced as quick and easy answers to school plant problems. All too frequently, new ideas are in fact rediscoveries of a previous innovation which has little, if any, merit in actual use.



The superintendent, architect and school plant consultant make plans to involve citizens and school staff members in the development of educational specifications for a new school plant. (Rochester Public Schools, Rochester, Michigan)

What the Consultant Offers

The school system which secures the assistance of a school plant consultant should expect and receive the resources of a competent educational leader. Yet, no district should expect to find a person who will be able to provide answers for all questions.

As the community moves toward improvement of its school facilities it should seek a sympathetic person who can work effectively with all groups. As issues arise, the consultant will assist in resolving them. As crucial and difficult places in planning are approached, the consultant advises and saves the community time, energy and money. If the community is overlooking certain aspects of the educational program, attention may be directed by the consultant toward a closer overall examination.

Large school systems, which are involved in continuing construction programs, usually have a staff of specialists to plan and work with groups in developing new school plants. Such communities will find that new methods and processes result from the research and service activities of the school plant consultant. The small community, finding itself without experience in planning and constructing new school facilities, will profit from the experience of the consultant.

The school plant consultant is one resource available to all local school districts and he may be counted upon for valuable assistance and improved educational planning.



The gymnasium building of the new Wilbert Snow Elementary School.

UNIT PLANNING FOR WILBERT SNOW ELEMENTARY SCHOOL



by CREIGHTON F. MAGOUN

Superintendent of Town Schools, Middletown, Connecticut

Dr. Magoun has a B.S. degree from the University of Rhode Island, an M.A. from Yale University and a Ph.D. from the University of Connecticut. Prior to his position at Middletown, he was superintendent of schools in Old Saybrook and Portland, Connecticut.



and WARREN H. ASHLEY

A.I.A., West Hartford, Connecticut

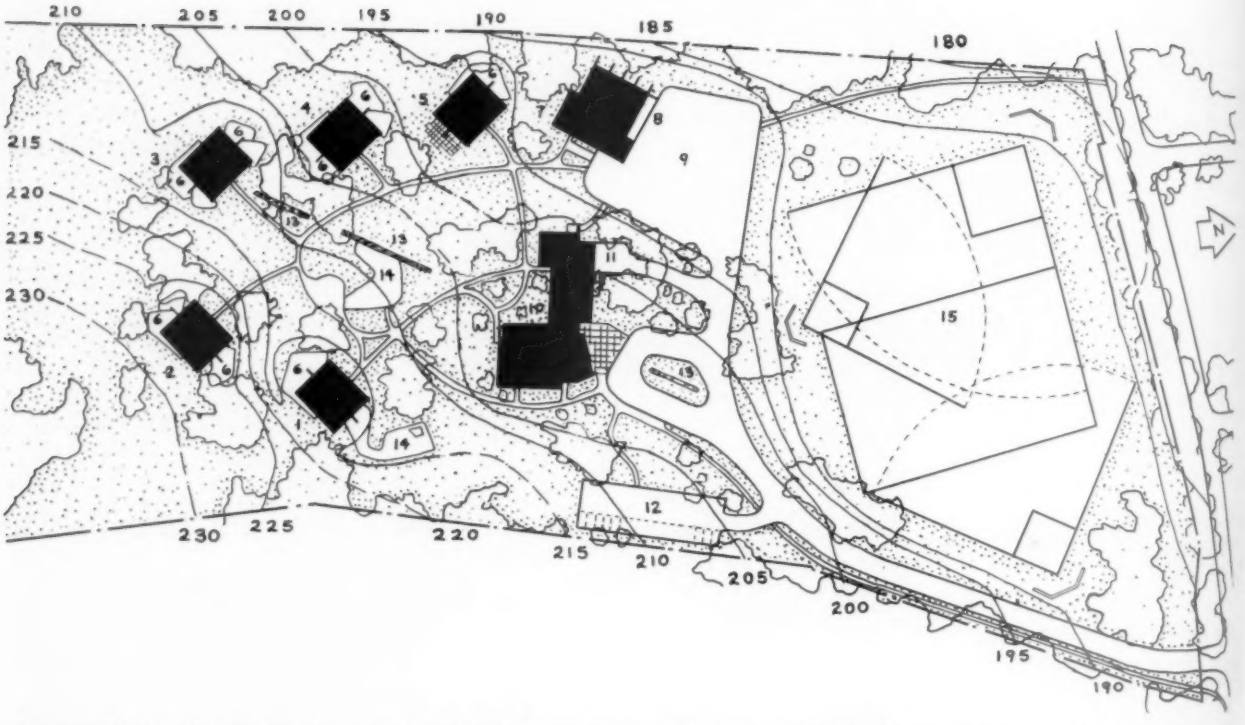
Warren H. Ashley received his Bachelor of Architecture degree from Syracuse University. He has designed over thirty school projects since World War II and was the first architect in New England to design public schools on the unit or campus plan.

MIDDLETOWN, Connecticut, with a population of 30,000, is the home of Wesleyan University and of many small industries. In the last several years two new elementary schools have been built in the older part of town and a new senior high school is in the planning stages. During 1953 several housing projects developed on the side of town that was once thinly populated farmland, and the Board of Education was faced with the problem of providing elementary classrooms for 600 pupils by the fall of 1954.

An appropriation of $850,000 was made by the town to include the purchase of a suitable site. It was regretfully acknowledged by the board that, with such limited funds, there would have to be a doubling up of the cafeteria with the library and of auditorium and gymnasium.

This doubling up would be even more of a headache than usual because of the importance the board attached to the use of certain facilities by adult groups. It was proposed to include, as part of the new school library, a branch of the Middletown Russell Library, to be open in the evening. The Park Department was anxious to have the gymnasium and playgrounds provide adequate recreation facilities for adults as well as for the pupils.

Warren H. Ashley of West Hartford, Connecticut, was selected as architect before any final decision had been reached on the site. The choice of sites had been narrowed to two. The one preferred by the building committee, before Mr. Ashley was consulted, was the type of comparatively flat, uninteresting land that is traditionally thought of as "a fine place for a school." Looked at solely from the point of view of economy, this may be true. The other site under consideration



Site plan of the Wilbert Snow Elementary School in Middletown, Connecticut. The building units and site areas are as follows: 1-5. Classroom Units; 6. Play Terrace; 7. Gymnasium; 8. Spectators' Porch; 9. Paved Multi-use Area; 10. Main Building; 11. Service; 12. Parking; 13. Existing Stone Wall; 14. Play Areas; and 15. Softball, Baseball and Soccer Fields.

was a 25-acre portion of what had been a beautiful old estate. The original mansion, now occupied by a Roman Catholic Retreat, is half a mile away from the lot line of the proposed school property, with dense woods between abounding with birds and small animals. The old roads are now wide grassy lanes with branches nearly meeting overhead.

A Likely Site

The architect and Charles A. Currier, land planner, also of West Hartford, were impressed by the educational potential of the site. However, of the 25 acres only about eight, nearest the street, were relatively flat. From there the land slopes up unevenly to one side and to the rear of the lot. If the board were to insist on a traditional type of building, there would be a great deal of expense thrown into site work. Several different floor levels, with the resultant space-consuming flights of stairs, would be necessary. In addition, bulldozing an area large enough for a twenty-room school, all in one piece, would wipe out many of the magnificent white oak trees with which the site is blessed.

The architect was convinced that a unit plan would answer all requirements and presented his ideas to the committee. The only objection raised was whether or not elementary school children should have to go outdoors to travel from one unit to another in the rigorous New England winter season. The building committee called an open meeting of parents and teachers to present the concept of a unit plan school. It was pointed out that an elementary school is not run on a bell system. If it is raining at assembly time, the meeting can be put off until tomorrow. If the children did not go to the school cafeteria for lunch, they would go home and probably get a lot wetter. They do not travel to other classrooms.

The result of the meeting was a unanimous vote of confidence for the building committee and for the architect. The unit plan school was given a green light and plans were drawn up. Completely eliminated was any need for doubling up facilities, thanks to the very pronounced economies of site work and construction achieved by housing the 20 classrooms in five separate and structurally identical units, located on several rather level portions of the site.

The level part near the street made possible the logical location, in the most accessible area, of the playing fields that were intended for maximum use by the community as well as by the pupils. The driveway enters at the side, swings across the front of the main building with a bus turn-around, branches out to parking and service areas and ends up at the gymnasium building, where the paved play area can be used for parking in the evening. Thus no car traffic whatsoever passes between classroom units and the other facilities, including the playgrounds. Adults can enter the branch library and the gymnasium directly from the driveway.

Main Building Areas

Primarily designed for elementary school children, the library has low book shelves, large expanses of tackboard on the walls and enough floor area for a story telling corner. Adults, to use the public library branch, have only to step across the entrance terrace and can enter the library directly.

The main building contains, besides the library, an auditorium with sloping floor and acoustical treatment of walls and ceiling. Although the auditorium seats 325, the stage is 26 feet deep and the back-stage is 50 feet wide. The emphasis will be on student participation in productions and on "Little Theater" activity by adults. The cafeteria, which seats 250, can also be opened separately for evening use. To provide for children's coats there are, near the auditorium, library and cafeteria, continuous shelves for hats and books with coat hooks below, all within easy reach, and continuous low benches for putting on rubbers and overshoes. There are administration offices, health offices and rest rooms, a teachers' suite and the building services.

The only basement area in the entire plant is below the service area and, in conjunction with storerooms in the other units, it provides adequate general storage space for the whole school.

Recreation Facilities

The gymnasium unit, to realize the fullest community use, has locker rooms, showers and toilet facilities for men and women, besides those with scaled down equipment for little boys and girls. There also are toilets accessible only from outdoors. The big single gymnasium can seat 300 on folding bleachers. It has a vaulted ceiling with exposed steel arches. Outside there is a covered porch for spectators, overlooking the playgrounds. Steam for the gymnasium unit is piped from the main building.

The Middletown Park Board and the Middletown Board of Education entered into a unique agreement spelling out each board's share of the responsibilities of maintenance and costs of the buildings and areas that are to be mutually used, and a time schedule for availability. A grant was made by the Park Board of $25,000 to achieve the program. This made possible, in an elementary school plant, athletic fields usually found in high schools in communities that are rather wealthy.

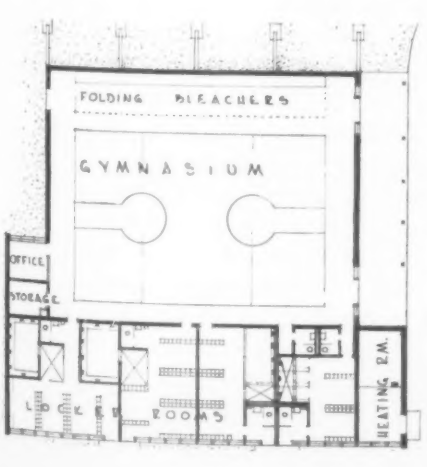
Just a few steps from each classroom unit are the woods—one big outdoor classroom. Here, the cub scouts will have a camp site for sleep-outs and eat-outs. Grown-ups and children will be assured of a lovely place to take interesting, healthful and safe walks, regardless of how developed the neighborhood becomes in the future. Even the addition, as needed, of other classroom units will not crowd this handsome site.

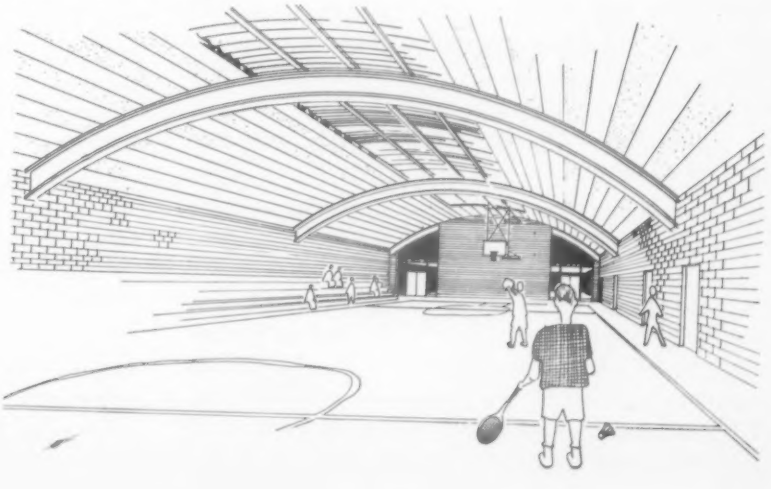
Five Classroom Units

One plan served for all five classroom units. The only differences are in the heights of casework, counters, chalkrails and coat hooks. Each unit has a short corridor with a floor of quarry tile, walls covered with plastic material, oak shelves, coat hooks and oak benches. There are toilets for boys and girls, a lavatory for the teachers, a janitor's closet, a store room and a heater room for the residential type boiler.

In Connecticut the minimum requirement for elementary classrooms is 750 square feet. At Wilbert Snow School each classroom has 835 square feet of floor area with natural light from two adjacent sides. Sills at one of these walls is at door head height with tackboard below to the base. Sills at the other wall are only 15 inches high. Low open shelving is flanked on either side by planting boxes for children's experiments with

The Gymnasium Unit is adjacent to the outdoor multi-use area. It includes locker and heating rooms, an office and storage area, as well as the gym.







Each of the classrooms in the Wilbert Snow Elementary School has 835 square feet of floor area. Natural light enters from two sides.

growing things. Each classroom has direct access to its own play area, separated by a screen from that of its neighbor. Each unit nestles beneath beautiful trees against a background of woods which invite exploration as an integral part of the classroom experience.

The exterior side of the strip below the low silled windows is of plastic in primary colors to repeat a decorative note used above the cafeteria windows and below the sills in the library.

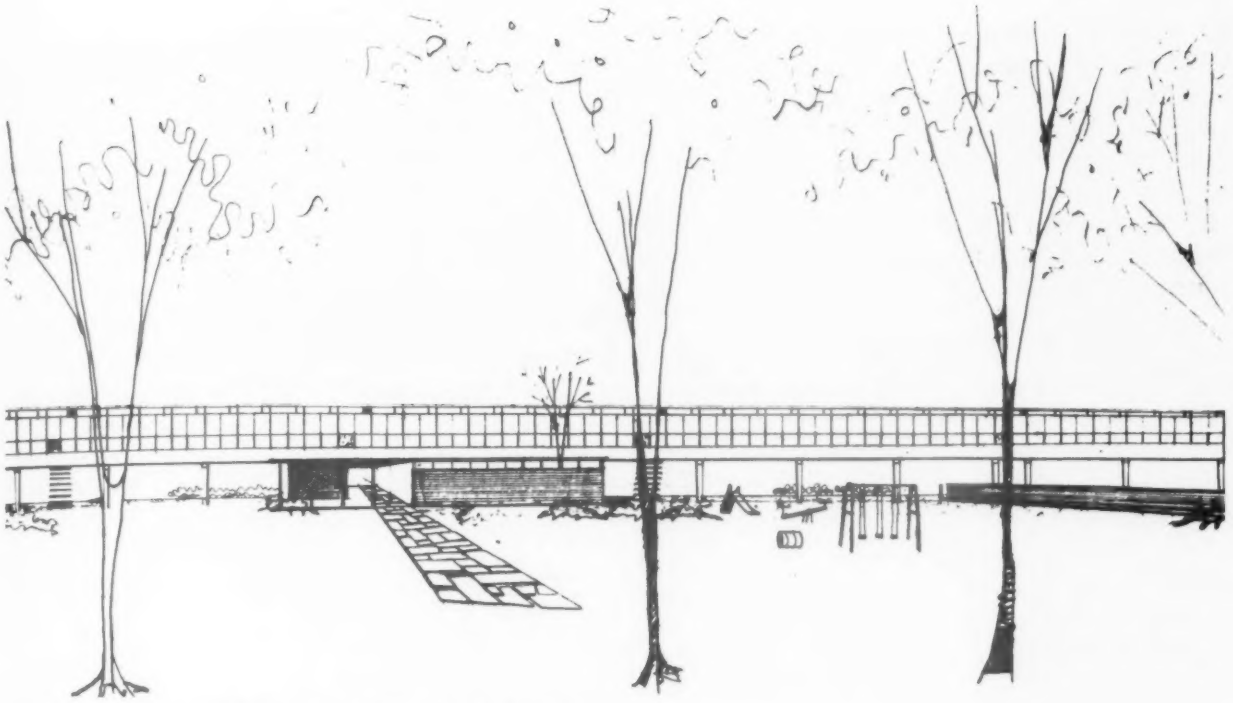
Roofs of the classroom units are lift-slabs raised by the Youtz-Slick method, the first operation of this kind in Connecticut. Troffers for the classroom lighting were recessed in the slabs during construction. Neither the thin concrete cornice nor the narrow aluminum gravel stop will need any painting. The same holds true of the hot dipped galvanized steel sash and the plastic spandrels. In fact the only exterior painting required will be on the doors.

Bids were opened in February, 1954. These were resolved as follows:

General Construction	$479,998
Plumbing	50,500
Heating and Ventilating	96,750
Electrical	55,500
Site	58,158
Equipment	52,000
Professional Fees	45,194
Total	$838,100

According to the Connecticut Public School Building Commission, the average elementary school built in Connecticut from August 1950, to September 1952, cost $1,464.09 per pupil. Costs since then have continued to rise. The Wilbert Snow School, with an enrollment of 600 and classrooms larger than the state requires, with separate library, auditorium, cafeteria, and gymnasium and including, as it does, high school type athletic fields and additional facilities for adults, costs $1,396.83 per pupil, or $67.26 less than the average of two years ago.

The Wilbert Snow School provides tangible evidence of the economy that can be achieved without any sacrifice of aesthetic or educational values, by unit planning for an elementary school.



Thomy Lafon Elementary School in New Orleans was designed by Curtis and Davis, architects, and accommodates 460 students.

THOMY LAFON—THE SCHOOL ON STILTS



by JAMES F. REDMOND

Superintendent, New Orleans Public Schools, New Orleans, Louisiana

Dr. Redmond began his school career at the age of 19 as a teacher in the public schools of Kansas City. There he became an assistant principal before entering the Army during World War II. He left the Army with the rank of lieutenant colonel. Dr. Redmond became an assistant to the superintendent of the Chicago Public Schools in 1948. Five years later he was appointed to his present position. He holds master's and doctor's degrees from Columbia University.

INTELLIGENT planning of a school plant demands more than a knowledge of the number of pupils to be accommodated and the site location and size. If the architect understands how the building is to serve in the education of its pupils and as a community center, he can provide a functional plant which will stimulate a better educational program.

This has been the guiding principle behind the design of 20 new schools in the 25 million dollar building program now underway in New Orleans, Louisiana. In each school an attempt has been made to create a building which satisfies the special needs of the pupils, their families and their neighborhood. Each school presented a different problem, and the architects have arrived at many different solutions.

One of the most unusual is the new Thomy Lafon Elementary School. The building attracted a great deal of attention because of its unique design. It was placed on "stilts," with the classrooms at a second-story level. Such construction appears quite unusual these days, but actually the design is a contemporary version of an older Louisiana architecture, dating back to the days when houses were built on high pillars to get living quarters above dampness, insects and possible flood waters. Architects for the new Lafon building were Curtis and Davis of New Orleans.

There was good reason for designing the Lafon School in this fashion. The new school for 460 pupils is situated on a very small site (approximately 3.5 acres) and for some years to come will be used in conjunction with an old frame school building accommodating 1,100 pupils. It was impossible to secure a larger site because

the school is in the middle of the Magnolia Public Housing Project. Raising the classrooms to a second-floor level created valuable play space underneath. It also made possible the elimination of enclosed corridors, thus effecting a substantial reduction in the cost of the building. Total cost of the school was $432,000. The building includes 13 classrooms, a cafeteria-auditorium and kitchen, administrative suite, health clinic, teachers' lounge and small library.

Construction Details

The classrooms are built on two rows of concrete piers, poured monolithically and supporting a concrete slab. There are two rows of transverse beams so designed that the slab is cantilevered a few feet outside the piers. Steel columns of the classrooms support steel bar joists upon which has been laid the roof decking, covered by the conventional, bonded, built-up roof. Partitions are of light-weight concrete blocks which have been neatly laid and pointed, then painted with cement base paint. Each classroom has bilateral lighting. The blue glass at the windows in light-diffusing and heat resistant. Each room is roughly 32 feet square.

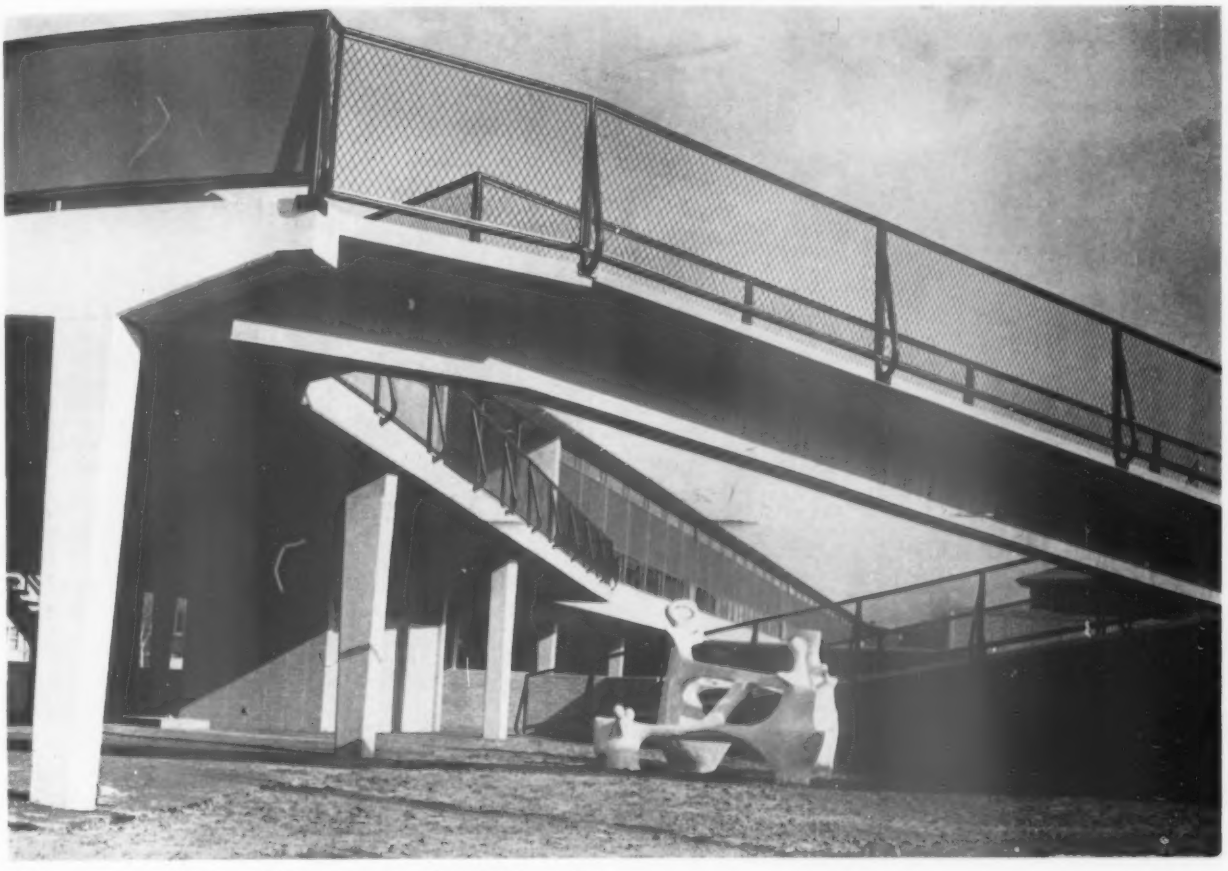
The cafeteria-auditorium and kitchen, administrative suite, library, teachers' lounge and health clinic were placed on the ground level, for easy accessibility for both school and community use. These facilities are also used by the 1,100 pupils in the old, frame building which will someday be torn down. Altogether the school has proved to be comfortable, pleasant and func-



Typical of the classrooms in the Thomy Lafon Elementary School is this spacious room. Light and air enter from both sides. The window glass is glare-proof and heat-resistant.



The small site of the school necessitated constructing the building on stilts. This enabled the use of a large area for playground and corridor purposes. Stairs lead to the overhead classrooms.



This play structure nestles within the ramp which leads to the kindergarten classrooms of the new Thomy Lafon Elementary School.

tional for the many uses for which it has been planned.

The Lafon School has also served a real need in its community. It is one of six schools in an overcrowded, slum area known as Back-A-Town in which one-third (some 60,000) of New Orleans' Negroes live. The school itself is situated in the center of a public housing project, but many of its pupils come from dilapidated, overcrowded homes in the surrounding area. Surveys and census records show that the average family income in the area is low, as is the educational level of the adult population. Health conditions are poor, and the neighborhood has a high rate of communicable diseases. It also has a high rate of crime and juvenile delinquency. Only last spring, the Lafon frame building was set afire several times.

No More Half Sessions

Because of the shortage of schoolhouses in the neighborhood, the old frame Lafon school operated on a double shift until the new building opened. This

The school is also designed for adult groups. At the right is the combination cafeteria-auditorium-assembly room for community use.



All corridors for the school building are located in the area below the classrooms. A stairway is the approach to each classroom.





The Lafon School is one of four new buildings which will help to provide better school facilities for children as well as fulfilling a great neighborhood need.

meant that children attended school only half of the day, then were left unsupervised for the remainder. The opening of the new school brought a great improvement for all, because it made possible a full day of schooling for every child.

School Fills a Neighborhood Need

The Back-A-Town area is also characterized by a lack of community facilities, such as libraries, parks and playgrounds. The new school, which is opened for worthwhile community activities when it is not needed for school use, fills a great need in the neighborhood. In other words, it is hoped that the new school will become a real center of educational and community growth for both adults and children.

Lafon is only one of four new schools in the Back-A-Town area. Two elementary schools, John W. Hoffman and McDonogh No. 36, were opened recently. A third, Carter G. Woodson Junior High School, went into operation in the early fall of 1954. These three schools, representing an investment of nearly $3.5 millions, will go a long way toward solving the New Orleans schoolhouse problem.

Like Lafon, they provide enough classroom space to give every child a full day of schooling. Altogether, some 2,500 children who have been attending school only half-day now get their education in new buildings on an all-day session. McDonogh No. 36 and Hoffman replace old, ramshackle frame buildings which will be abandoned. For many youngsters it is their first time in a clean, decent schoolhouse. It is also the first time many have known a hot school lunch in an attractive cafeteria, electric lighting or even a classroom with a modern heating system instead of old coal stoves.

FOR RUMSON, NEW JERSEY—A THREE-FOLD SCHOOL



by CHARLES A. WOLBACH

Superintendent of Schools, Rumson, New Jersey

Dr. Wolbach has been superintendent of the Rumson Public Schools for the past twenty years. He is a graduate of the State Teachers College in Kutztown, Pennsylvania, and has an A.B. from Lehigh University, an M.A. from Columbia University and a Ph.D. from New York University.



and JAY C. VAN NUYS

Jay C. Van Nuys and Associates, Architects, Somerville, New Jersey

Jay C. Van Nuys was graduated from Pratt Institute School of Architecture in 1937 and became licensed by the State of New York in 1938. He has operated his architectural practice in Somerville since then and for the past five years has specialized in school design. Mr. Van Nuys is a member of the A.I.A.

AN elementary building divided within itself might be a good way to describe the proposed new Elementary School for the town of Rumson, New Jersey. The school is planned to accommodate three basic age groups from kindergarten through eighth grade under one roof. Each age group is adequately and conveniently served by common facilities, yet separated to retain the desired degree of privacy. This design is the culmination of many months of work by the educational staff of the school system, the architects and their educational staff members.

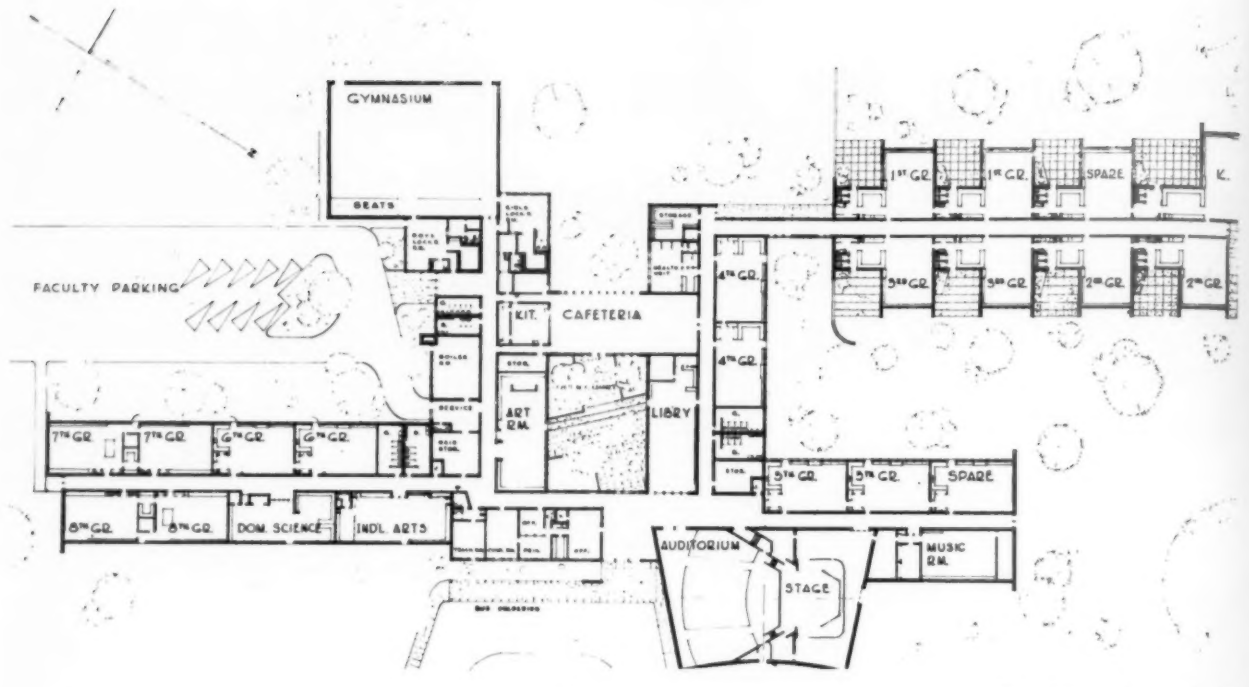
Before any drawings were made, the first major step was the development of a "Design Program" embodying a clear expression of the educational program, the philosophy behind that program and the architectural implications in terms of spaces and space relationships. This was done in a 24-page document prepared by Dr. George W. Holmes, educational associate of the architectural firm, in close conjunction and cooperation with Dr. Wolbach, superintendent, and Mr. Francis E. Hockey, elementary school principal. The document was accepted and adopted by the Board of Education and formed the criteria from which the building design was developed.

While essentially a working document for the architects to follow in the development of plans for the proposed building, the "Design Program" has also served well as a source reference for public relations material, press releases and supporting data when preliminary plans were presented to the State Department of Education for approval. The following excerpt from the "Design Program" summarizes the educational philosophy of the Rumson elementary system:

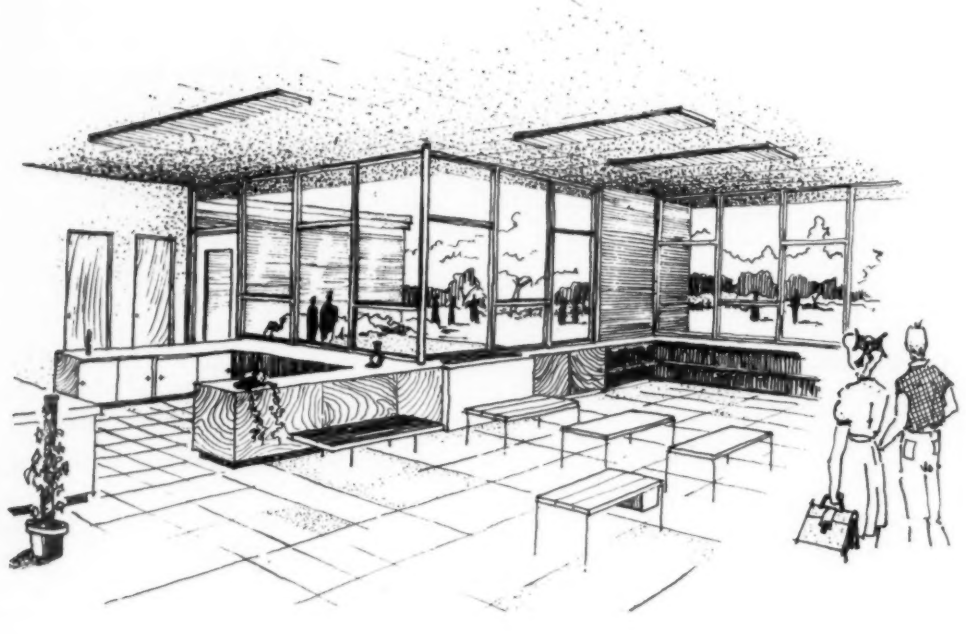
> The program is based on satisfying basic needs characteristic of elementary school children. These have been determined to be:
>
> *Educational*
>
> 1. A mastery of the fundamental skills necessary for success in reading, language arts, number concepts, the social studies and other related areas of knowledge.
> 2. Progress and achievement geared to each child's interests and abilities.



Entrance detail of the new Rumson Elementary School. The overall design of the building consists of three wings to house K-3; 4 and 5; and 6-8 grades.



The three wings of the building are clustered about the gymnasium, cafeteria, library, auditorium and art rooms. Rooms in the K-3 wing are L-shaped (see left).



Physiological

1. Need for active movement relieved by periods of relative quiet.
2. Need for personal hygiene facilities.
3. Need for proper diet.

Psychological

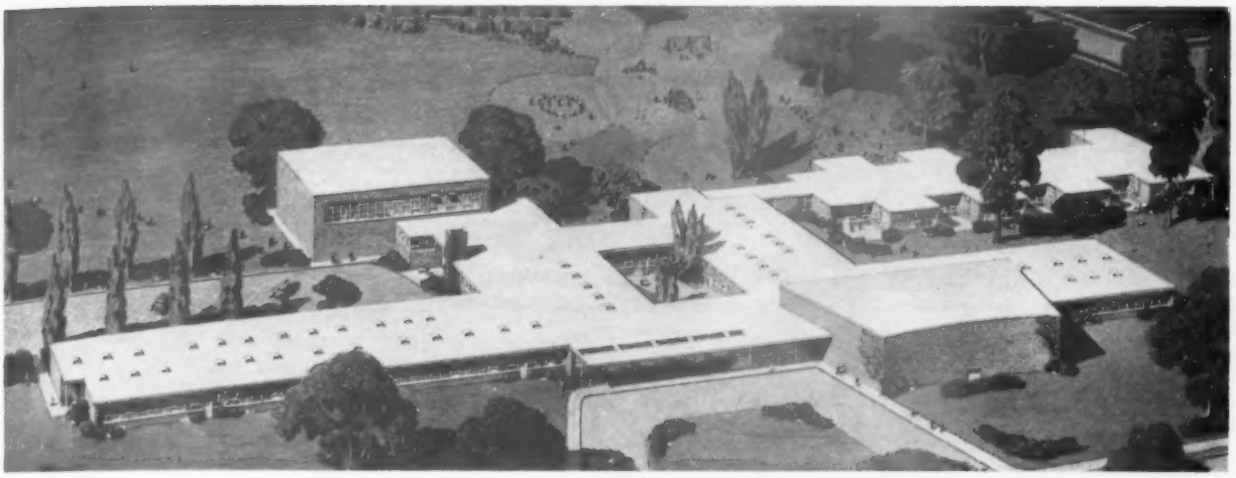
1. Need for security.
2. Need for new experiences, to experiment, to see things.
3. Need for success and some little failure.
4. Need to be accepted by others.
5. Need for independence.

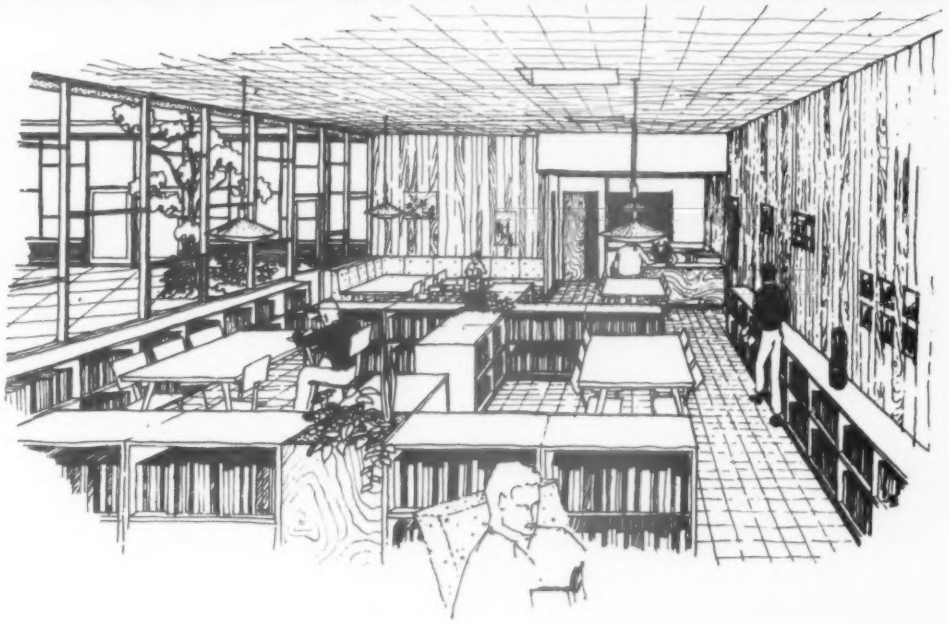
Social

1. Need for affection.
2. Need for recognition.
3. Need for companionship.

Methods of Meeting Needs

The educational program of the Rumson Elementary School attempts, insofar as possible, to meet these needs. It operates through the use of small group and, where practicable, individual instruction. The program provides many opportunities for working with a variety of materials. It fosters the ideal of pupil-teacher planning, with the results then worked out cooperatively.





In the Rumson plan the different classroom wings have convenient access to the common facilities, and all are under one roof. The library, at right, is adjacent to an open court located centrally in the building plan.

Through constant in-service training, cooperation with local child guidance clinics and assisted by advice from remedial specialists, the staff employs the latest professional techniques in introducing the traditional 3R's. To supplement these areas of learning and enrich daily classroom life, emphasis is placed on music, games, rhythms and practical art expression. Other major objectives of the program are: (1) development of the habit of realistic self-evaluation; and (2) learning to like and work with other children and to respect their wishes, their rights and their personalities.

There is common acceptance of the concept of complete separation of kindergarten units from the balance of the elementary plant. This has resulted from an attempt to make the transition from home-life to school-life as simple as possible for the kindergarten child.

The Rumson program recognizes that the physiological and psychological requirements of children in grades one to eight continue to vary and to require special consideration. The Rumson plan accomplishes this by separating the K-8 enrollment into three major groups—K-3; 4 and 5; and 6-8. These groups have been physically separated into different wings gaining most of the advantages of the current popular "cluster-type" arrangement. At the same time the advantages of a one building scheme, with convenient access to common facilities under one roof, are retained.

The Seventh and Eighth Grades

The facilities for the seventh and eighth grades embody a unique approach to the educational needs of this age group. This is expressed in another excerpt from the "Design Program."

"It seems wise to plan facilities for grades seven and eight which will help bridge the gap between elementary school and high school. It is anticipated that the program for these grades will be neither the self-contained classroom program of the elementary school nor the departmentalized program of the high school.

According to present thinking the program will be organized around blocks of time in certain areas of the curriculum.

"For example, one-half of the seventh grade might be assigned a two-hour period for homeroom activities, social science, language arts and related activities. During the same time the other half of the seventh grade might be engaged in homeroom activities, mathematics, science and related activities. These groups would exchange rooms for another block of time so that those pupils who had been engaged in social science-language arts would participate in the math-science part of the program. The other group would change activities accordingly. Shop, homemaking, music and art classes would be scheduled for special rooms. The program for grade eight would follow the same pattern.

"Activities for both grades will vary from research and the preparation of reports and projects by individuals and small groups to periods of time when the entire group concentrates on the same phase of a particular problem. It is anticipated that, as much as possible, emphasis will be placed on small group and individual instruction."

Space requirements for each of the classroom group areas, as well as all of the special areas involved, were given detailed study by the staff and the educational staff associate of the architectural firm. These were enumerated in the "Design Program" in great detail, and dealt generally with the amount of space required; the environment desired; a study, for each curriculum area, of the group sizes participating; and the physical facilities necessary to properly implement the program.

The Site Arrangement

The site acquired by the board for this new school consists of a block of municipally owned land originally purchased for use as park land. A portion of this site has been dedicated to school building purposes and will adjoin a future park development which will supplement the formal play areas of the school grounds. Bounded on three sides by secondary streets, the site has convenient separate access for bus loading, faculty and visitor parking, as well as lower grade parent pick-up and delivery of children.

The major wings housing the three grade groups radiate from a central area which contains the common facilities for all grade groups. The lobby, library, cafeteria and art suite surround a central enclosed court which will be partially paved and landscaped, providing an interior vista from each of these areas. A small auditorium with a capacity of approximately 300 and complete stage facilities is centrally located and available for community use. The gymnasium will house a junior high school basketball court with spectator seating provisions for approximately 300 to 400 persons.



The interior court of the Rumson Elementary School can be reached from the cafeteria, art room and library.

Common Facilities

The core of common facilities, namely, cafeteria, art room, library, lobby and auditorium, will form the cultural center of the plant. Of particular interest is the recognition by the administrative staff of the desirability of a cafeteria which is more than a "lunchroom." This room has been designed with large glass areas opening onto the interior court on one side and to an exterior court on the other. There is a pleasant vista in either direction. The environment of the room itself is designed to make the process of eating an educational one, rather than a time period in which so many students have to be "fed."

The "L" shaped classrooms of the K-3 wing are of particular interest. They not only provide a very flexible interior plan arrangement which permits three or four activities to take place at the same time, but also provide each classroom with a paved exterior court.



HIGHLANDS ELEMENTARY SCHOOL IN MILLBRAE, CALIFORNIA



by EARL R. KUHN

Superintendent, Millbrae Elementary School District, Millbrae, California

Mr. Kuhn has a B.A. degree from San Jose State College, and an M.A. from Stanford University. He has taught in rural schools in Wisconsin and South Dakota, and was a teaching-principal in Santa Cruz, California. Mr. Kuhn has been superintendent of the Millbrae Elementary School District for the past 22 years.

WE, in Millbrae, California, are proud of the new Highlands Elementary School. Architect John Lyon Reid has designed a building whose simplicity of design, location on the school site and convenient features combine to create a very pleasant atmosphere for school children. It is easy to carry out the best possible educational program in a building such as this.

Pleasant, convenient surroundings and adequate facilities are conducive to good teaching and administration. They also give a child a sense of pride in his school and the children at the Highlands School are no exceptions. The entire plan and color scheme of the school have played an important part, psychologically, in making the school child a happy child.

Within the classrooms the work areas and sink are located away from the entrance. Special activities can be carried on with a minimum of distraction for pupils studying at their desks. Two ceiling heights insure good lighting at the desk areas, and help create a division of the classroom into a study section and activity areas.



The kindergarten has 36 square feet of floor area. There are individual compartments under the cork pinning strip for storing the personal effects of the pupils. To the left are additional cupboards for teacher use. The coat closets at the left can be hidden with sliding doors.



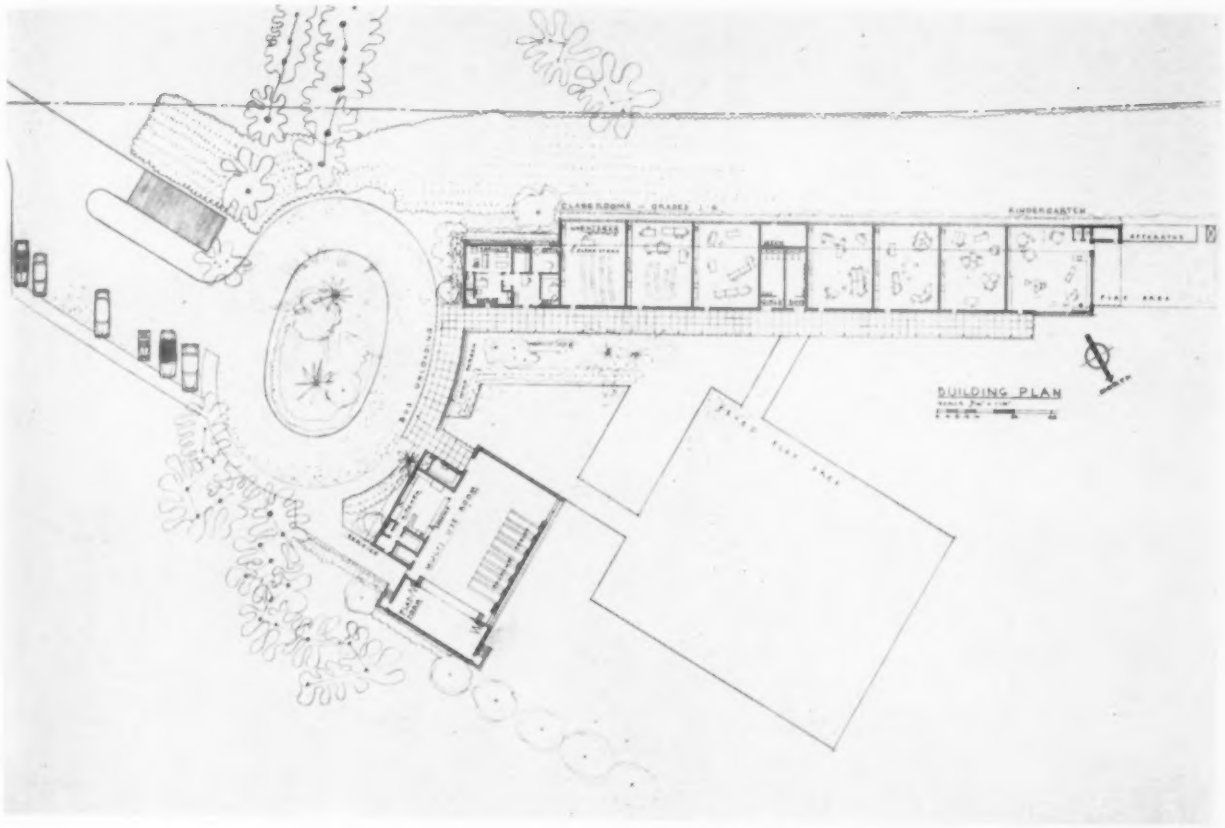
Classroom interior of the Highlands Elementary School, showing details of the windows and clerestory. Louvers control daylight entering through the clerestory.

There are shelves beneath the windows in each classroom for library books or other items. In the primary areas all shelves and drawers are at a suitable height for young children.

Highlands School has a kindergarten and classrooms for grades one through six. There are separate paved play areas for primary and elementary grades. The offices, faculty room and clinic are located at one end of the classroom wing.

Multi-Purpose Room

The large multi-purpose room has been in constant use as a classroom. Teachers have remarked that it is as adaptable for teaching as a regular classroom. In-wall tables quickly change the room into a cafeteria after use as a classroom or other purpose. The kitchen with



Site and building plan for the Highlands Elementary School, John Lyon Reid, architect. A circular drive, at left, leads to the bus loading dock, the service drive and the parking area. A wind screen shelters the children as they board or depart from the buses.



A canopied concrete runway joins the main building with the multi-use room. The runway also serves as a shelter for children boarding the school bus during the rainy season. Quarter-inch tempered plate glass panels separate the play area from the runway and driveway.



Sturtevant Photos

Corridor and play court of the school. All classrooms open onto the main concrete corridor which extends into the extensive play court area. This facilitates better playground supervision and a safer approach from the play area to the classrooms. The play court has asphalt concrete paving. Beyond this is a turf play field.

its modern equipment can be screened from the main room by the operation of roller-type panels. There is a platform stage at one end of the multi-purpose room.

The multi-purpose room is connected to the classroom wing with a covered corridor. This corridor continues along the full length of the classroom section. It is also adjacent to the paved playground and a turfed playfield. It gives one the impression of old Spanish architectural charm and gracious living.

There is a paved circular drive at the entrance of the building which is convenient for school bus loading and unloading. From here the children proceed directly under the covered corridor to their classrooms. This drive does not interfere with the space provided for faculty and other parking.

All the exterior finish on the building is stained redwood.



Doorway of the administrative offices and warehouse of the East Whittier Elementary School District in California. Warren and Taylor are the architects of the building.

EAST WHITTIER SCHOOL DISTRICT OFFICE AND WAREHOUSE



by WILLIAM HENRY TAYLOR

Architect, Pasadena, California

Mr. Taylor is a graduate of the College of Architecture, University of Southern California. He is a member of the American Institute of Architects and the Housing Research Council of Southern California.



and ROSCOE L. WARREN

Architect, Whittier, California

Mr. Warren has a B.S. degree in Architecture from the University of Missouri. He has been a certified architect in California since 1925. A member of the American Institute of Architects, Mr. Warren is also a certified civil engineer.

THE East Whittier School District, in common with many districts in Southern California, has found itself in an area of phenomenal growth. In a period of less than five years the number of children in the district has increased from 700 to 7,000. From two school plants the district has grown to nine and projects for the future include four additional schools.

Paralleling this growth has been the district's increasing need for program supervisory services as well as increased central warehousing facilities. Mr. Charles Samuels, the superintendent, and the architects, in seeking a solution to the district's administrative housing problem, established these general policies:

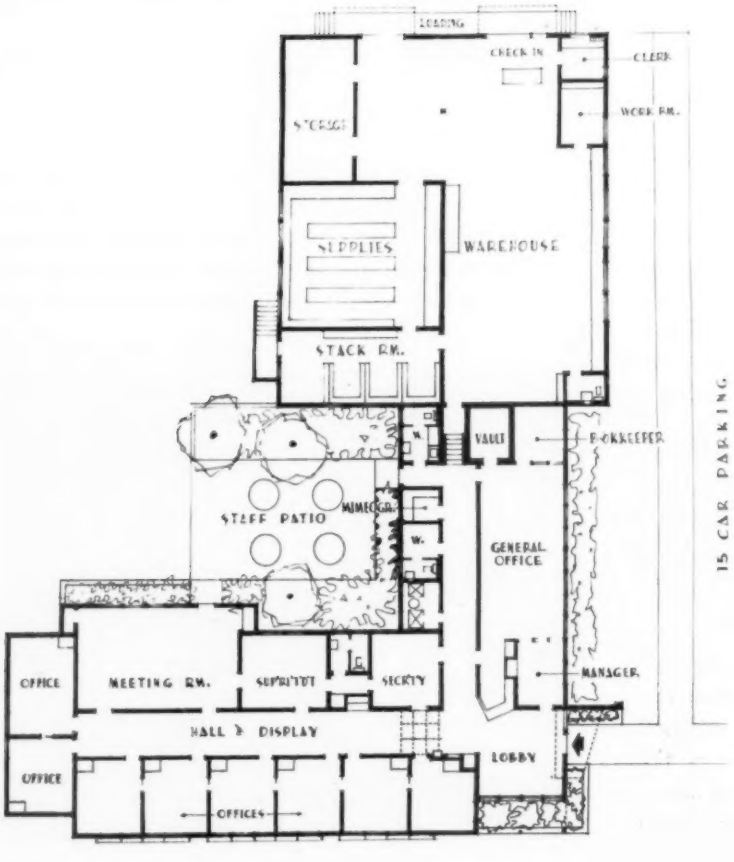
1. The building areas should be related to expedite the staff function of the personnel. In practice this meant that the program supervisors were grouped with the assistant superintendent in charge of the educational program; and that the accounting, bookkeeping and warehousing facilities were grouped with the assistant superintendent and business manager.
2. The room arrangement should be flexible to accommodate changes in personnel and program.

Hallway of the administration building has high clerestories.





Spacious board room of the East Whittier administrative offices has translucent draw drapes which give a softened lighting effect to the room.



The plan at left shows the division of area between warehouse and administrative office functions. All areas are grouped about the staff patio.

3. The building should be designed so that it could be easily expanded for increased staff and housing demands.
4. The building should provide efficient and attractive quarters for the school board and staff. It should be conducive to a sympathetic and congenial understanding of the problems of public education by the public and school administration.
5. The type of construction should be a sound capital investment financed under the California State Aid program with only functional architectural treatment.

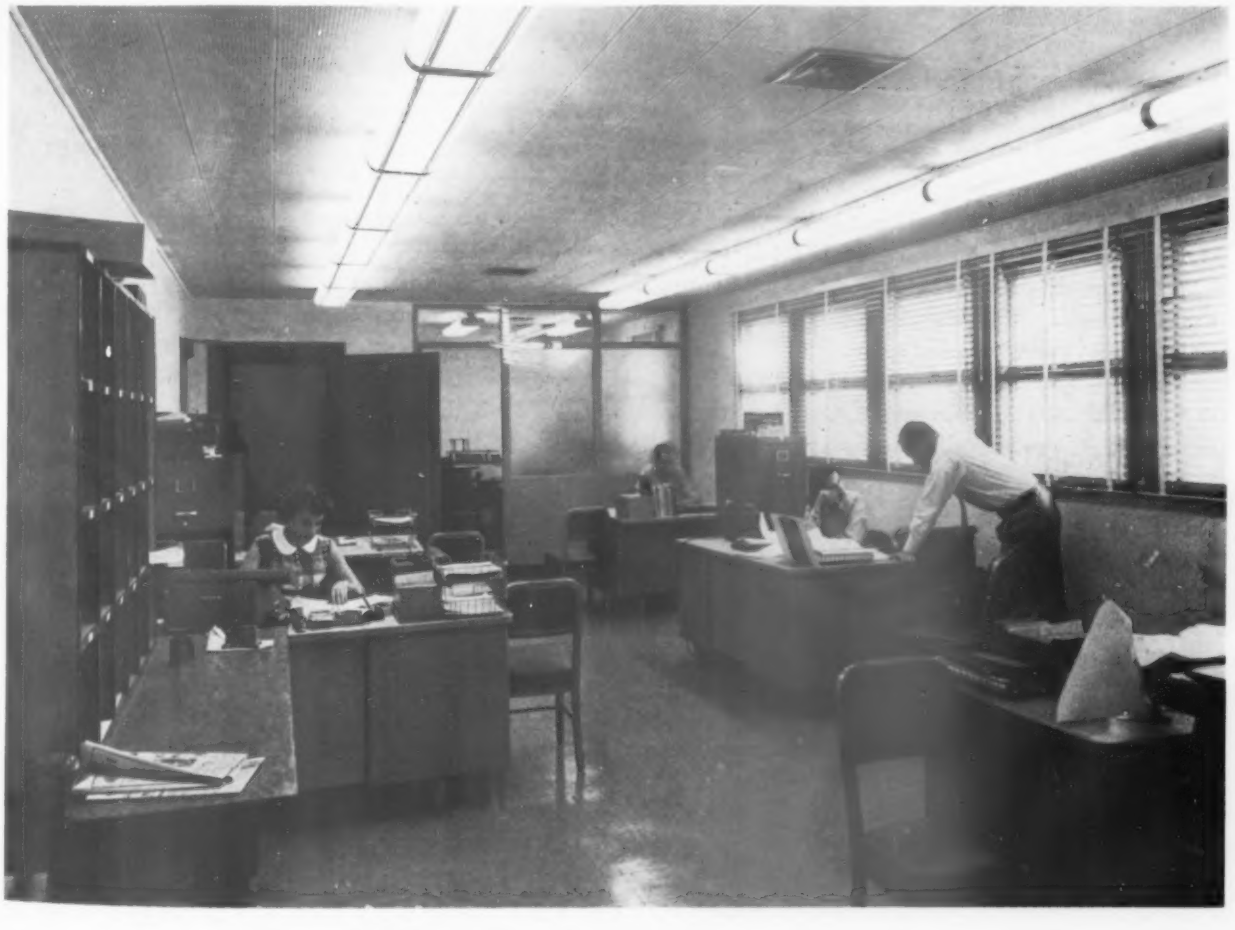
Plan of the Building

The plan of the building shows the architects' solution. A total of 4,925 square feet of space were allocated to the offices and 3,960 square feet were provided for warehousing, including an insulated room for surplus food stuffs and a nominal textbook depository. It is the policy of the district to store as many of the operating supplies as is practical at the various school sites.

The educational program group includes a guidance department with a physiologist and a psychomatrist, and reading, art, music, speech and physical educational consultants. These consultants assist with the basic core program of the district. The consultants' offices have interconnecting doors for group arrange-



Supplies for the offices are located conveniently nearby. The general office, below, leads off from the lobby. At the rear right is the bookkeeper's office and to the left of this is the vault room.





The growth of the East Whittier School District has necessitated new, modern quarters for the district office and warehouse.

ment and built-in storage and bookshelf space. A supply of folding chairs for conference use is available.

Additional building space can be added by extending either leg of the L-shaped building and adding consultants' offices or warehouse space.

Special attention has been given to the public's use of the building. The lobby serves as a reception room, from which the receptionist can direct the visitor to the proper office. The corridors are wide and lined with tackboard for exhibit material, and the board room is equipped with a kitchenette for use by P.T.A. groups and the staff.

The building is a Type V frame structure with asphalt tile floors, plastered walls, acoustical tile ceilings, composition roof and forced air heating. The unit cost was $10.22 per square foot.

Both the staff and the school board have found this building to be a practical solution to their housing problem. Already there is consideration being given for expansion.



D. J. Higgins

Classroom in the Savanna Elementary School, Stanton, California, H. L. Gogerty, architect.

Dearborn, Michigan, Schools



Reversible tackboard-chalkboard-art easel sections and work sinks in classrooms of the Samuel B. Long School, Dearborn, Michigan, permit students to try out their artistic talents.

SELF-CONTAINED CLASSROOMS MAKE THE GRADE



by RALPH W. CHERRY

Professor of Educational Administration, University of Texas, Austin

Dr. Cherry has been professor of educational administration at the University of Texas since September, 1954. He was formerly superintendent of schools in Owensboro, Kentucky. Prior to that he was professor of educational administration and head of the department at the University of Kentucky. He served in the U.S. Army Signal Corps in World War II. Dr. Cherry received his A.B. from Maryville College, his M.A. from the University of Kentucky and an Ed.D. degree from Teachers College, Columbia University.

THE term "self-contained classroom" conveys a combination of concepts about organization, curriculum and school buildings. One of these is that a single teacher should be responsible for the guidance and instruction of a group of pupils for at least one school year. Special teachers may be employed, but they are not to work with groups according to a rigid schedule. Instead, they are resource people, on call as they are needed.

In this framework almost any type of program can be operated, but today's educators advocate one which embodies a wide variety of activities and is flexible in operation. Classrooms for such a program are designed to serve practically all of the personal and learning needs of a group of children. The number of specialized spaces is reduced accordingly.

The extent to which these ideas are being and can be used as bases for design is a question which should be considered carefully by every school plant planner. Attempts to put the self-contained classroom policy into effect have thus far been confined almost entirely to the elementary school. The tendency is to make primary classrooms more nearly self-sufficient than rooms for the middle and upper grades.

Most junior high schools still use a departmental plan of organization, but there is a growing trend to reduce the degree of such a plan. This is apparent where a single teacher is assigned full responsibility for the "general education" or "common learnings" of a group. Few new schools show any notable effects from these changes, however. At the senior high school level neither program nor plant has been affected to an appreciable extent by the ideas of the self-contained room.

Those who maintain that the sole function of any



Willard Stewart

Flexibility in their learning situations is available to the students in this classroom. Entrance at left leads to the out-of-doors. The outdoor area supplements the confines of the classroom as additional space for pupil activities.

school is to teach a predetermined set of facts and skills well may reject the ideas of the self-contained classroom. Those who believe that the school should be concerned with all aspects of growth and development and with all problems of living in a community are likely to see the advantages of a broad and flexible program and of the single teacher per class idea. In the opinion of many people the self-contained classroom is the logical arrangement for putting such a philosophy into practice. It provides for flexibility, permits and encourages unity and consistency and affords opportunity for the teacher to become acquainted with the pupils.

Special Interests Will Emerge

These ideas are not equally applicable at all levels of education. Special interests emerge as children develop toward maturity and specialized instruction becomes necessary. Also, older children need wider social contacts. Elective courses and activities, calling for some departmentalization, must come into the picture somewhere along the line. In many school systems, however, this change comes too early and too abruptly and is carried to an unwarranted extreme. A gradual transition, beginning not earlier than the junior high school, is suggested. Also, it seems reasonable to propose that secondary schools should provide classrooms designed to serve all of the common needs of assigned groups of pupils.

Preparing educational specifications for a new building which will have relatively self-contained classrooms is a difficult but most important task. The advantages of cooperative planning have often been pointed out and demonstrated. Enough time must be allotted for planning, but this warning is too frequently disregarded. Above all, a high quality of leadership in planning is essential.

A useful classification of the functions of a self-contained classroom is given by Perkins and Cocking in their book, *Schools.*[*] They propose that there are six functions which any classroom must fill, and that a self-contained classroom must serve *all* six, emphasizing none to the exclusion of others. The six functions are:

1. Individual formal work
2. Group formal work
3. Individual informal activity
4. Group informal activity
5. Clothing care (outer wraps)
6. Toilet provision (personal hygiene)

This classification provides the framework for developing a statement of educational specifications for a classroom. Attempts to design and equip classrooms which serve these six purposes have resulted in many innovations. Old standards of size, shape and facilities have become obsolete.

An appraisal of the major changes resulting from acceptance of the self-contained classroom is now in order. One obvious change is an increase in size of the classroom. The "standard" classroom of yesterday provided no more than 750 square feet of floor area. The modern, self-contained classroom has an average of approximately 1,000 square feet. In some new buildings there are classrooms with more than 1,200 square feet

[*] *Schools,* by Lawrence B. Perkins and Walter D. Cocking, Reinhold Publishing Corporation, New York, 1949, p. 64.

of area. Thirty square feet per pupil is accepted as a minimum in some states but this figure is otherwise considered inadequate.

Space Is a Cost Factor

The size of a classroom has significant bearing on the kinds of activities which can be carried out effectively and is a major factor in the ultimate cost of the building. Rooms which are too small hinder the educational program and its effectiveness. Unnecessary space costs money which could be used to secure other benefits. In this dilemma the school plant planner should resist the temptation to adopt an arbitrary standard proposed by this or that authority. An analysis of the activities to be carried out in a given classroom provides the only sound basis for determining the size of that room.

Limited finances have sometimes prohibited a desired increase in the size of classrooms, at least for a time. School designers have found ways to reduce the effects of these limitations by the use of movable partitions and other such devices. One specific plan calls for classroom wings which can be divided as desired now and changed later. For example, a wing can be divided into four rooms for the present, as dictated by financial ability. Later on a change to three rooms would be easy if movable partitions are used and if the design anticipates such a change.

Movable partitions are also used in place of a corridor wall. Thus the little-used corridor can serve for most of each day as a part of the classroom. The possible uses of movable space dividers seem to be numerous.

A simple and frequently used plan for providing more teaching space at little extra cost is to make the adjacent outdoor area a part of the classroom. A connecting door and some equipment are the essentials, but a terrace and a separating hedge add to the idea. In many places and for many types of learning activities, the out-of-doors is the ideal environment.

When classrooms are provided which are relatively self-contained, the amount of specialized spaces should be reduced. Educators do not agree on the best solution to this problem. The multi-purpose room has not proved too satisfactory as a substitute for more specialized spaces, nor can the regular classroom serve every learning need. It appears certain that some specialized space can be eliminated when self-contained classrooms are provided. For instance, "gang" toilets can be eliminated or their number of fixtures reduced.

Cost is not always a prime consideration, nor is it intended that it be regarded as such. Space is too important to be sacrificed unnecessarily on the altar of economy. Cutting cost by reducing space is an expensive way to save money. The children pay in the long run. There are no complaints, as yet, that a room containing 1,200 square feet is too large, but we know now that one with 750 square feet is too small to serve the six functions mentioned earlier.

Room Can Be Any Shape

With the improved methods of lighting, a classroom can be almost any shape. The self-contained classroom and related ideas have led designers to use a variety of shapes. The square room is a favorite and has many advantages. It avoids the excessively elongated areas which a rectangle would require in a room of the size suggested. It permits almost any arrangement of furniture and equipment for a high degree of flexibility. It is readily adapted to audio-visual situations. On the other hand, experience may show that hexagonal and parabolic rooms will meet these requirements, and, in addition, provide better acoustical and psychological situations. More evidence is needed before definite conclusions can be drawn.

Concerning facilities, the demand is for movable



An essential part of the self-contained classroom is adequate facilities for care of children's clothing. The doors which conceal the clothing area in this room form a chalkboard when closed.

Kelsey



A sink and work surface, display cabinets and a tackboard line one side of the classroom in the Moph Elementary School, Lansing, Michigan. Warren S. Holmes is the architect of the building.

and stackable furniture, light in finish. Each classroom should have its own sink and drinking fountain. A workbench and various work surfaces are essential. Since many types of materials and supplies will be used, ample storage facilities are important. Filing equipment should be of different sizes and shapes, preferably designed for specific purposes. Movable files, bookcases and the like are preferred to built-in equipment. Personal possessions, such as outer wraps, are cared for in a wardrobe within the classroom.

The big issue today with respect to facilities seems to be whether the toilets should be in the classroom or in a central place. It is a fairly common practice to place toilets for primary children in the classroom. Few schools have gone further and tried such a plan for older children. However, to-date there is an almost unanimous vote of approval from such schools. The point is well taken that the necessities of hygiene are opportunities to teach. Another argument advanced in favor of classroom toilets for all elementary grades is that some minor problems of discipline are thus avoided. The future will surely bring more light on this whole question as more schools try out the idea of toilets in classrooms.

No discussion of the self-contained classroom would be complete without a comment on the subject of physical comfort and health. These persistent concerns of the school designer assume greater importance than ever in the self-contained classroom. Visual, auditory and thermal conditions have a bearing on good learning and good health. Science is providing better and better ways of lighting, heating, ventilating and sound-conditioning for school buildings. The technical problems are too complex for most of us to understand but we can all recognize the importance of utilizing what has been learned about needs and solutions. The guidance of the best technical experts available should be sought.

Psychological Comfort, Too

Designers of classrooms have recently shown an increased concern for psychological comfort, too. The benefits of a pleasant, cheerful, home-like atmosphere are recognized. "More intelligent use of color," "greater attention to scale" and "efforts to provide for a feeling of unity with the out-of-doors" are comments made about some of the newer self-contained classrooms. These are steps in the right direction.

This appraisal of the self-contained classroom idea and its execution concludes with these generalizations. In the first place, the recent progress in school plant planning is most encouraging. While there is still room for improvement many old obstacles have been removed. In the second place, the next major steps in improving the self-contained classroom are likely to be taken by educators. Further improvement of the program and better ways to describe it to architects will lead to better designed classrooms—self-contained or special, elementary or secondary.



In rooms using tables or desks with limited storage, individual storage cubicles can be used to hold the children's books. The cubicles also give both counter and work space. They can be placed with open ends touching to form a neat, closed unit.

Dearborn, Michigan, Public Schools

SELECTION OF EQUIPMENT IN ELEMENTARY SCHOOLS



by DAVID S. BRAINERD

Principal, Edward L. Brown School and Boulevard School, Denver, Colorado

Dr. Brainerd has served the Denver Public Schools during the past twenty years as a teacher and principal in the secondary and elementary schools. He has A.B., M.A. and Ed.D. degrees from the University of Denver. Dr. Brainerd is a member of Phi Delta Kappa and has held several offices in that organization.

MONEY for the purchase of equipment is an important item in the budget of any school system. The method used in selecting equipment may be the factor which determines whether or not this money is used wisely or if the equipment makes a maximum contribution to the educational program.

Traditionally, equipment is selected by the administration or members of the board of education. It is purchased from public funds and placed in the hands of the teachers for use in the educational program. Under this system the delivery of equipment is occasionally the first indication a teacher has that new equipment is being provided. The teacher may have preferred other equipment, or may not be able to make the best use of this new equipment in his program. Such a selection procedure often results in a less efficient educational program, frustration of the teacher and a waste of the taxpayers' money.

Equipment which does not make a contribution to the educational program is superfluous. The program of education varies in each elementary school classroom according to the methods and techniques of instruction used by each teacher. His philosophy of education and his personal characteristics also affect the learning situation. In addition, pupils' interests, abilities and demands, expectations and attitudes, affect the educational program.

Variables to Consider

The method of selecting equipment for classroom use in elementary schools should take these variables into consideration. This can be done best if teachers

and pupils who use the equipment are given an opportunity to participate in its selection. They will then be able to use this equipment more efficiently in carrying out the particular program. For example, flat top pupil tables can be placed together to provide large flat working areas for art work, committee work, etc. A teacher who depends upon these types of activities would be handicapped in a room equipped with individual lifting lid desks.

The board of education and the superintendent should recognize the necessity of meeting these variable needs and should develop a plan which gives teachers an opportunity to express their equipment needs. This plan need not be complex. In the small school system, the teacher may be able to work directly with members of the board of education. In medium sized districts the teacher may work with the superintendent to select equipment which will be recommended to the board of education for purchase. In the large city district it may be necessary to use a committee technique to select alternate types of equipment for approval by the board of education for purchase and use in the classroom.

If the committee technique is used, the members should be chosen carefully. Basically, the membership should consist of teachers who have had some experience with different types of equipment. Wherever technical advice seems necessary, experts should be called in to consult with the committee. The committee might need engineering experts to help evaluate mechanical aspects of equipment. Art supervisors could be used to determine aesthetic quality. Architects can give valuable assistance in determining some types of equipment. Factors which tend to increase the utility "built-in" or free standing equipment. Efficiency experts may be used to help determine the comparative dollar value of equipment.

The selection of the equipment, however, should rest primarily with the teachers, subject only to the financial limits imposed by the board of education and such rules and regulations as seem absolutely necessary. If children are not included on the committee, teachers should always have in mind their wishes and needs. Children should have the opportunity to examine the equipment under consideration for purchase. They should be encouraged to express preferences and observations for consideration when final decisions are made.

When new or additional equipment is needed in a particular classroom, teachers and pupils should initiate requests for the equipment. These requests should be honored according to the procedures established by the selection committee of teachers and by the board of education.

Desks can be obtained with tops surfaced with plastic materials for easy cleaning.



Fiberesin Plastics Company

Establishing Criteria

The committee charged with the responsibility of selecting equipment, or any school official for that matter, should have certain standards or criteria as a guide to direct the selection. While it would be difficult to establish criteria applicable to all equipment, there are some principles which are sufficiently general to deserve mention.

A major concern of parents and educators is the *safety* of children. Safety should always be a prime consideration in the selection of equipment. In the elementary school this criterion would apply particularly to playground equipment, gymnasium equipment and, in some instances, to industrial arts equipment.

Equipment should be sturdy and easy to maintain. This has implications for economy as well as for safety. Equipment must be free of projections which may prove hazardous. Care should be taken in its placement —proper orientation, traffic lanes and pedestrian surfaces should be considered.

A second criterion is the *general utility* of the equipment. Factors which tend to increase the utility are flexibility, simplicity and size.

Flexibility indicates the possibility of using the equipment in various ways and is greatly increased by the choice of free standing equipment. This principle was recognized by many school planners when fixed furniture was replaced by moveable furniture. The principle is beginning to be applied to traditionally "built-in" equipment such as storage cabinets, book-

T. Baumritter Co. Inc.



It is important to select equipment that is properly sized for the student users.

shelves and coat racks. A motion picture projector mounted in a projection booth has less flexibility than one mounted on a stand with castors. Moveability tends to promote flexibility.

Another way to increase flexibility is by selecting equipment which will serve more than one purpose. Combination slide and filmstrip projectors and three-speed record players are examples. However, a word of caution should be included at this point. Equipment designed to serve many purposes sometimes serves each of them less efficiently than equipment which is designed to serve a single function.

The simplicity of equipment also contributes to its utility. Many teachers, with a limited knowledge of mechanical features, tend to avoid the use of mechanical equipment. Usually, less complicated equipment will be used more extensively.

Light-weight equipment will have more utility than heavy-weight equipment. A record player which can be handled by a pupil will be used more often than one which must be transported by the custodian.

Make Sure It's the Proper Size

The most useful equipment will be the proper size. This is true whether furniture, plumbing equipment, playground equipment, pencils or scissors are being considered. Equipment which is too large or too small tends to make its use difficult, and may encourage bad use habits. A less efficient educational program, even a negative situation, may be the result of using equipment which is not of the proper size.

Aesthetic quality is proposed as the third criterion to be used in the selection of equipment. In general, attractive equipment will tend to create a more favorable learning situation. Equipment may be used to illustrate many of the art principles which are being presented in the educational program. Children love color. They react psychologically to colors which produce a light, joyful atmosphere, a feeling which can be created partly through the selection of equipment.

Pastel Colors Prevail

The traditional buff and brown school room is giving way to pastel colors. Dark wood surfaces and black base furniture are being replaced with light wood surfaces and gray, beige or tan bases. The traditional



Useful equipment for flexible classrooms are movable cabinets such as those found in the William Clark Elementary School, Dearborn, Michigan.

Dearborn, Michigan, Public Schools



Economy in equipment selection can be achieved with the purchase of multi-purpose equipment like the combination chalkboard, tackboard, art easels used in the kindergarten of the Long School, Dearborn, Michigan.

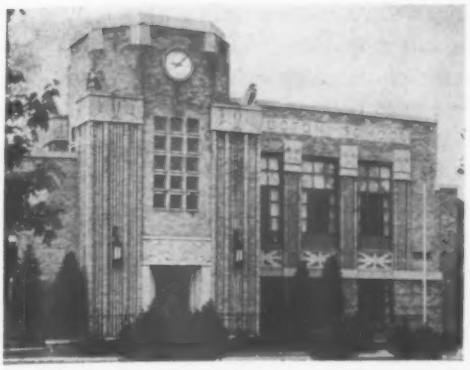
wood floor is being supplanted by colorful linoleum and composition tile surfaces. This trend should be carried further in regard to equipment. Why should projectors be beige or brown, file cabinets olive green or office grey, plumbing fixtures primarily white and auditorium curtains dark blue, purple or brown? Here are opportunities to provide additional color in the school. Some manufacturers need to be challenged in this matter, although often the boards of education may be induced to pay the slight extra cost necessary for more colorful equipment.

The Question of Economy

The question of *economy* in the selection of equipment is usually a pressing one. School authorities should strive for economy and endeavor to stretch the equipment dollar as far as possible. However, a distinction should be made between true economy and false economy. The least expensive equipment may not necessarily be the most economical and may result in false economy. True economy takes into consideration such things as durability, costs of maintenance and the contribution made to the educational program.

Results of Successful Selection

What are the probable outcomes of following the above suggestions for the selection of equipment in elementary schools? First and most important, equipment selected by teachers and pupils to meet their specific needs will improve the efficiency of the educational program. Second, true economy in the expenditure of the money provided for equipment will be more nearly achieved. Third, teachers who feel a responsibility for the selection of the equipment with which they work and are able to secure the things they need, become better teachers and community servants. There is better staff morale when teachers feel this responsibility and understand some of the administrative problems involved. Fourth, teachers and pupils who have a high morale tend to support the school system in the community, and provide a sound basis for a good public relations program.





Since World War II the design of secondary school buildings has progressed from massive traditionalism to spread out campus-type plans like the Senior High School (shown at right) for West Springfield, Massachusetts, by Warren H. Ashley, architect.

SECONDARY SCHOOL DESIGN SINCE WORLD WAR II

by WALTER D. COCKING

Editor, American School and University

AMERICA is now rapidly moving into a period when major emphasis in school plant planning, design and construction will be centered on secondary schools. The great majority of communities will face the need for one or more new secondary schools within the next ten-year period. These new plants will not only cost billions of dollars; they will also largely determine what takes place within them. In fact, the planning of these new plants will determine secondary school programs for America during the remainder of this century.

It will be helpful, as we approach this undertaking, to take a good look at the secondary schools which have been built since World War II. It is the purpose of this article to examine the planning, design and construction of secondary schools built during the past ten years, and to draw from our findings such conclusions as may seem justified.

Although there is no record of how many secondary schools were built in America during the year 1946, we do know that the number was far below the 1,496 secondary schools constructed during 1954. It is estimated that the peak of secondary school construction will be reached by 1960, and then will continue at approximately that level for a number of years.

Prior to World War II, secondary school buildings were chiefly planned according to structural efficiency, compactness and capacity. Apparently little consideration was given to the characteristics of the youth who would use the buildings or to a program needed by youth. Since World War II there has been a slow but steady awareness of these two factors, and evidence indicates that there is now more emphasis given to them in planning new plants. Let us consider the non-architectural characteristics now affecting the design of new secondary schools and particularly the influence upon them by the growing consideration given to the nature of youth.

The Nature of Adolescents

Architects, educators and citizens have come to realize that school buildings are planned and constructed primarily for people—in the case of secondary schools, for adolescents. This planning concept has raised the questions, "What are the nature and characteristics of adolescents? Do they differ from little children only in size? Are they different from adults, and if so, in what particulars?" Secondary school planners are searching for answers to these and similar questions. Psychologists, anthropologists and sociologists have been enlisted in the task. Research and study have made some revealing information on the subject available, with more coming.

It is significant that school planners are beginning

to recognize the importance of understanding the nature of the age group as a primary step in planning a good school building. However, in far too many cases, new secondary school plants are still being constructed which are not planned according to the characteristics of youth.

Changes in the Educational Program

The secondary school program has usually consisted of groups of subjects. The underlying factor which determined these subjects was college entrance requirements. Most secondary school officials felt that they should offer the subjects most colleges considered to be desirable preparation for higher education, regardless of how many students actually went to college. However, while more and more of our youth attend high school, only about 20 percent attend college. For a majority of students, then, high school is their last formal education.

It must be noted that many semi-vocational and vocational subjects have been added to the so-called "academic" or "college preparatory" list. These subjects are supposed to meet the needs of the non-college student. Yet the emphasis very often continues to be on subjects *per se*.

Despite this, attention has been given to what is taught in each subject with particular emphasis on the procedures and activities involved. As a result, a number of developments have affected the size and shape of the spaces housing high school subjects. Of particular note is the emphasis on creating "learning laboratories" rather than rigidly appointed classrooms.

Changes in Who Does Educational Planning

In the period immediately following World War II educational planning was usually carried out by the administrative staffs of the schools. Considerable reliance was placed on surveys, frequently made by the staff of a nearby college. Data usually dealt with school population figures and projections; school enrollments; dropouts; graduates of the high school and their futures (how many went to college, how many found work in the community, etc.); bonding leeway of the district; the effect of a proposed bond issue on the tax structure; conditions of present buildings; and the location of new buildings. An examination of the studies and surveys made during this time shows little attention to what was to be taught in the school, the activities in which pupils would engage, competencies of the teaching staffs, organizational procedures of the school, and no attention whatever to the nature and characteristics of adolescents.

In the late forties and early fifties, three significant developments in educational planning emerged. One, there was a growing tendency to use the entire staff of the secondary school in some phase or phases of planning for a new secondary school. Accordingly, there was a broadening of the scope of planning and more attention was given to outlining what was taught and methods of teaching. Such planning was often subdivided under subject matter headings.

Two, plans were made to use committees of citizens in the planning program. Administrators admitted frankly their fears of this procedure. They felt that citizens' committees would cause trouble rather than do good; they wondered what citizens knew about schools anyway. Many such committees were organized. And many proved to be constructive and helpful. It soon became apparent that in the communities where citizens' committees were used, the resulting bond elections for the new schools were often successful.

Three, special consultants who were supposed to have "know how" in educational planning were employed to help guide the planning activities. Some proved to be helpful, others were not. Yet, the net re-



Roger Sturtevant

A study of the characteristics of youth is an important prelude to planning secondary school buildings. Rooms and areas should be planned for the adolescents who will use them. Informal study is being undertaken in this classroom in the Healdsburg, California, High School by Falk and Booth, architects.

sult was a gain for educational planning everywhere.

In 1955, educational planning is accepted generally as a necessary step in the process of obtaining a new secondary school. Those who carry out this planning may have little of the skill and understanding needed for the task; yet, on the whole, most secondary schools are now being designed with a knowledge and insight that was largely lacking in the past.

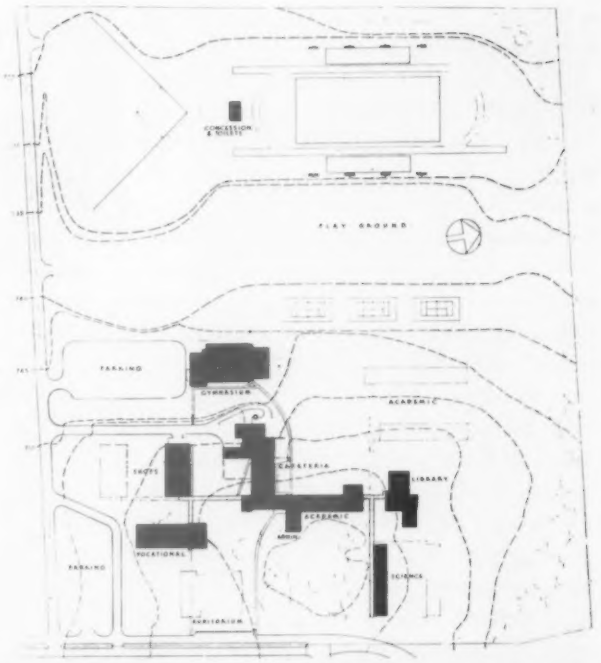
Changes in Secondary School Sites

A phenomenon of the last ten years is the increase in size of the sites for new secondary schools. An outgrowth of this is the varied and greater use made of land as part of the secondary school program. It had been unusual for a secondary school site to be in excess of ten acres. Sites of 50 or more acres were unheard of. Suggested standards usually indicated that a site of approximately ten acres was entirely adequate.

Yet, in less than ten years, the size of secondary school sites has increased until the figures show that the average size for sites on which a new secondary school was constructed in 1953 was 37 plus acres. Many exceeded 50 acres and a considerable number, even in congested areas, comprised more than 100 acres.

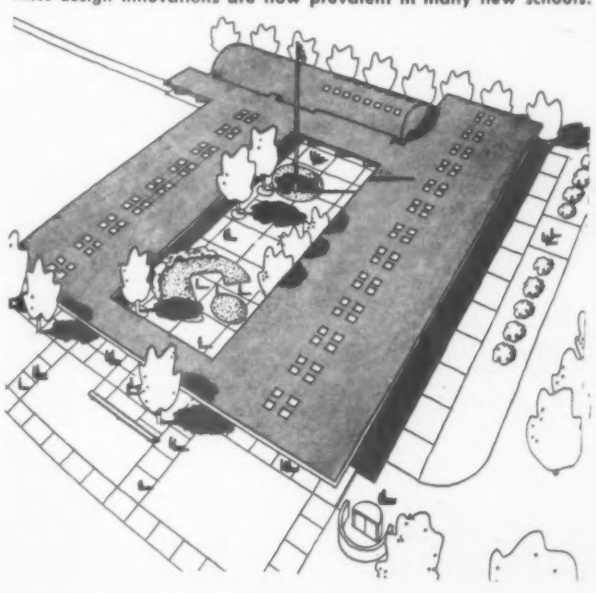
How did this come about? Several factors have been of influence. The tendency to design structures of the "sprawled out" type required more land than the monumental structures of earlier years. Off street parking for automobiles played a part. Recreational activities, both of the school and of the community, were given space on these secondary school sites.

Most important was the concept of using the outdoors as a place for learning. Biology and nature study, in particular, could find no better laboratory than the outdoors. Many new sites have locations set aside as nature areas, including woods, water, shrubbery and ravines. Demonstration gardens and plots are more in evidence, and they require land. Natural amphitheaters and outdoor art classrooms are becoming popular. Some secondary schools even provide space for an airplane field or landing strip. In northern parts of the country, school land is used for skating rinks, toboggan slides and ski jumps.



The trend toward designing secondary schools as campus plans has increased the land requirements for sites. The West Charlotte High School, Charlotte, North Carolina, was designed by architects Graves and Toy as six main units on a large site.

The Mirabeau B. Lamar Junior High School by Caudill, Rowlett, Scott and Associates is an umbrella scheme with a spacious inner court. These design innovations are now prevalent in many new schools.



Architectural Considerations

Despite the lack of adequate educational planning and the high degree of seeming complacency on the part of many educators and architects, some advances in the architectural design of secondary schools were effected during the past ten years. Undoubtedly, the refreshing designs of new elementary schools and the general approval which greeted them helped to give architects courage to consider design innovations for secondary school buildings. Another favorable factor was the work of citizens' committees. These committees generally concluded that changes were needed in both the secondary school program and in the plant. Many architects tried to find better solutions.

The overall result in 1955 is a state of ferment. The situation has simultaneously been proclaimed as either chaotic or healthy and hopeful. Designs range all the way from the traditional monumental battlements of the past to wide open umbrella schemes with eye-catching modernistic embellishments. More specifically, the design of secondary school plants has moved,

in the past ten years, toward the following conditions in all parts of the country.

Trends in Buildings

One story structures (rarely more than two stories) were built. Campus type plants (a series of buildings rather than one large building under a common roof) were more numerous.

A new concept of design employed an umbrella roof supported on stanchions. Side walls of masonry and large areas of glass were constructed independent of roof structural supports.

Building interiors were brought into proximity with the outdoors. Attempts were made to give "oneness" to the whole interior rather than to create a feeling of separation for each component part or space. Designs directed toward achieving an atmosphere of friendliness and warmth characterized attempts to humanize rather than to institutionalize school buildings.

Entire plants were made as flexible as possible with spaces designed so that they could be used for several purposes. More interiors were planned so that spaces could be increased or decreased in size when necessary.

It was found that greater attention was given to establishing special student social areas. These spaces are frequently called "the commons" or students' lounge.

The adaptation of buildings to their sites constituted another important development. Many interesting experiments were made on rolling or hilly land.

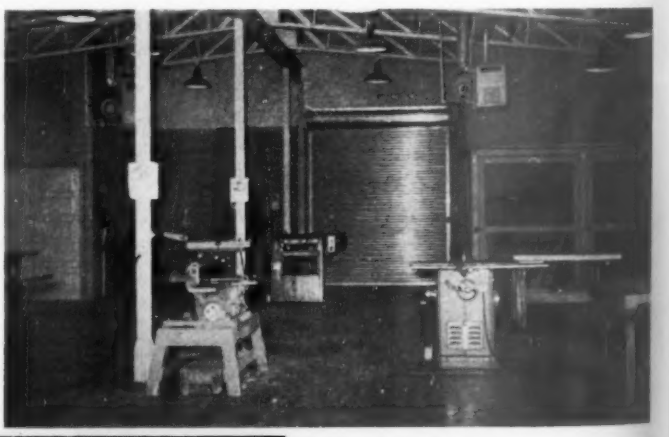
Attempts were made to eliminate corridors as such, or at least to find uses for them in addition to circulation, and to replace their dark, tunnel-like appearance with a light and airy one.

Large spaces, such as lunchrooms, were decentralized to give the effect of a series of spaces rather than one immense area. The size of auditoriums decreased so that they could become truly educational places rather than "spectacle" areas. Although gymnasiums still seem to be designed primarily for basketball and spectators, a number of auxiliary rooms are now being provided to enhance a well rounded program of physical education.

Classrooms are more and more being designed as laboratories for learning or as work spaces.

At long last, the design of science rooms is adapting what industry has learned about spaces where science principles and processes are used. It is apparent that few new secondary schools will have special science lecture rooms or uniform science desks for every student. Also, it appears that the total facilities available will increase in number.

Shops for secondary schools are being designed for general rather than specialized use. Spaces and facilities are planned to enable the user to perform almost any



School shops are now being designed for general rather than specialized use in many cases. Spaces and facilities enable many different activities to take place. The Robert E. Lee High School in Baytown, Texas, has a new Shop Building, designed by architect Lowell Lammers.

Roger Sturtevant



Well rounded programs of physical education require ample areas and auxiliary spaces like the gymnasium building for the Alhambra Union High School in Martinez, California. John Lyon Reid is the architect.



The band rehearsal room in the Senior High School of Texarkana, Arkansas, by Reinheimer and Cox, architects, is testimony to the increased attention and care being given to planning areas for music education.

The homemaking department of a high school is one special area which has benefited enormously from the latest developments in equipment and design. A particularly pleasing room is the department in the Cumberland Valley High School, Cumberland County, Pennsylvania, by architect Edmond George Good, Jr.

Ken Smith





Reynolds

In many new schools the library is prominently located in a central area easily accessible from any other unit of the high school. Books are usually conveniently located on low shelves, as they are in the library of the Base Line Junior High School in Boulder Colorado. James M. Hunter, architect.

type of activity in a given shop, resulting in economy of time, supervision and money.

Special facilities for music are better planned and more space is being devoted to music. In addition to the appearance of special spaces for band, orchestra and choral groups, the past few years have witnessed the provision of more special practice rooms for individuals and small groups.

Secondary School Libraries

Changes in the administration of secondary schools—resulting in greater recognition of the individual pupil, of classrooms as laboratories, of teachers as helpers rather than "tellers," and the use of many materials rather than one textbook—has affected the function and procedures of the secondary school library. The library is now being considered as the universal laboratory of the school. As a result, in many new buildings the library is the focal or central space around which all others are designed and to which they are related.

More space is assigned the library and efforts have been made to make the area attractive, homey and restful. The stack room, as such, seems to be disappearing. Books are found everywhere on conveniently located low shelves. Alcoves and conference rooms are provided. Probably no other space in new secondary schools has taken on greater importance or been given more attention.

All new secondary schools have an area labeled "guidance." Here again, we have recognition of an emphasis on program. There seems, however, to be a lack of imagination and information regarding the amount and character of space needed for specialized guidance services. More room than formerly is designated for this purpose. Ordinarily it consists of small offices and conference rooms, all made a part of the general administrative suite. It is felt that the lack of definitive information concerning the purposes and character of guidance areas will continue to hamper their design. Continued and detailed study of these areas will provide much needed information for school planners.

The practice of assigning a classroom or laboratory to one teacher as his classroom, office and general headquarters is disappearing. The arrangement was wasteful and uneconomical. Many of the newer buildings include innovations for teachers' office space and study

and conference rooms. Experimentation should be continued.

Also, there is a growing recognition of the need to provide specially designed space for "off duty" use by teachers. It might be described as the teachers' "living room." Again, there is considerable experimentation in designing this type of space, and much improvement has resulted. Perhaps the greatest result attained so far is recognition of the need for such spaces.

Engineering Aspects

The engineering aspects of the secondary schools constructed in the past decade have shown great improvement. There has been more understanding of how proper air conditioning, lighting and sound control affect people. Furthermore, research and technology are giving us better answers to environmental questions. This means important changes for today's buildings and even more so for buildings of the future.

Building Costs

The continuous upward spiral of costs in our whole economic structure during the postwar period is reflected in the rising costs of secondary school buildings. At the same time, it is important to note that school building costs have risen much less rapidly than costs for the building industry as a whole. A conservative interpretation of this fact must conclude that, either we are constructing less expensive buildings than formerly, or else ways have been found to provide school buildings at lower unit costs than other types of buildings. It may well be that elements of both possibilities affect the true picture.

In any event, school boards, citizens, educators and architects have become very "cost conscious." Everyone is interested in "economy" and valiant efforts are being made to obtain it. This economy drive, however, has brought to the fore certain considerations. Among them are: (1) Is real economy necessarily secured by keeping the initial cost to the lowest possible figure? (2) Are we sacrificing the possible total life of the building in part in order to reduce the initial cost? (3) Do lower initial costs increase maintenance and operation costs for the buildings? (4) Are the savings in initial costs of the building resulting in inadequate and incomplete facilities?

The answers to these questions are difficult to attain and are generally inconclusive. The whole problem deserves a lot more study, and much research is needed.

Everyone is looking for a good "unit of measure" for use in making comparative cost studies of buildings. No adequate or meaningful one is yet available. The square foot cost is the unit most commonly used, but obviously cannot apply equally to different buildings, for too many other factors are involved.

Finally, there seems to be little evidence, if any, that buildings will cost less in the years ahead. Building costs can be expected to remain close to present levels for the foreseeable future.

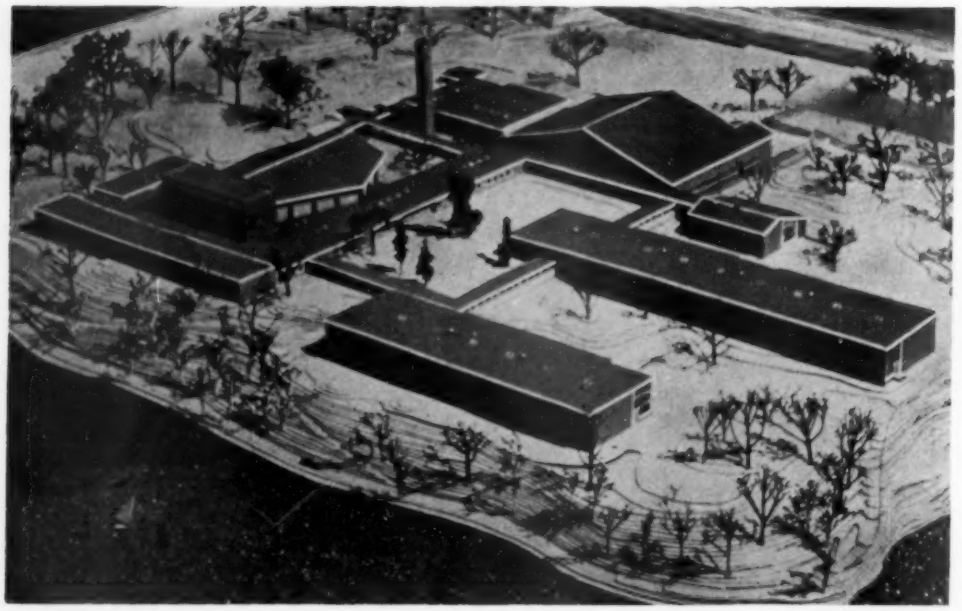
The Issues Involved

The experience of these past years helps in setting forth a number of the issues which must be resolved so that youth can have the kinds of plants they need for their educational laboratories. Listed here are



Ken Smith

The teacher is no longer the forgotten man in the Cumberland Valley High School in Cumberland County, Pennsylvania. Architect Edmond George Good, Jr. has designed an attractive and homey faculty lounge for the teaching staff of the school.



The Natick, Massachusetts, High School by Shepley, Bulfinch, Richardson and Abbott and Smith & Sellew, architects, utilizes certain features of the campus plan and has an effective grouping of the educational elements.

a few which seem most important.

1. *Nature of Youth.* How can buildings be designed to take into account the nature of youth? How should the nature of youth modify the design?

2. *Flexibility.* What are the best design solutions for an ever changing secondary school program?

3. *Human Values.* Can secondary school buildings be humanized so that they are comfortable and appealing places in which to live?

4. *Economy.* How can true economy in the construction of new secondary schools be achieved without, at the same time, sacrificing the environmental needs of youth?

5. *Planning Processes.* Can good educational and architectural planning materially improve secondary school buildings or is "planning" a phantom process?

6. *Leadership.* How can the general level of educational and architectural planning be lifted so that today's "best" practices become common practice?

7. *Research.* How can a program of research be organized, financed and conducted so that better answers are found for many of the present unknowns?

Some Difficulties

Every movement and every enterprise faces difficulties. The past decade of secondary school plant planning and design has confronted many obstacles. Among the more important ones are:

1. The *complacency* of architects and educators.
2. The *tradition* of the past.
3. The *lack of understanding* of the place of secondary schools in American life.
4. *Lack of understanding* of how people learn and develop.
5. *Ignorance* of the nature of youth.
6. *Too much emphasis* on original costs of buildings.
7. *Non-acquaintance* with good planning processes.
8. *Over-emphasis* on certain secondary school facilities to the detriment of others.
9. *Orders, regulations and cost considerations* which frequently place architects in straight jackets and make it impossible for them to seek the best solutions.
10. *Too little understanding* of the importance of a building in modifying human behavior.

Better Progress Now Urged

Definite progress has been made in the past ten years in obtaining better secondary school plants. In terms of what remains to be accomplished, however, this seems little and insignificant. The need to plan and construct hundreds of new secondary school buildings during the next few years gives an urgency to greater and better progress right now. America's best is required and there is no reason for delay.



Sprague

In adolescence, as in early childhood, growth is rapid.

ADOLESCENTS AND THEIR SCHOOLS



by ROBERT E. BILLS

Associate Professor of Psychology, University of Kentucky, Lexington, Kentucky

Dr. Bills received his M.A. and Ed.D. degrees from the University of Kentucky and Columbia University. He held science teaching posts and a principalship before joining the staff of the University of Kentucky as associate professor of psychology. Dr. Bills has published many research articles, as well as case study materials.

and ROBERT L. HOPPER

Director, Bureau of Research and Service, Michigan State College, East Lansing

A graduate of North Texas State College, Dr. Hopper received his M.Ed. degree from Harvard University and his Ph.D. from New York University. Before joining the staff of Michigan State College, Dr. Hopper was director of the Bureau of School Service at the University of Kentucky and director of educational finance, New Hampshire State Department of Education.



Is there a need to plan secondary school buildings in light of the changing objectives of schools and our understanding of adolescents? When the present century began, the objectives and curricula of the public schools were quite similar to those of the private schools they had replaced. In the private schools emphasis had been on the common branches of learning which were the vocational tools of the merchant-farmer middle class and on Latin, a prerequisite for the professions. Children were sent to these private schools to learn the facts and skills which were considered necessary for success.

Today's teachers are aware of different responsibilities in the education of people. Teachers realize the need for vocational training of the type offered by private schools of the nineteenth century, but they are also more aware of their responsibilities for the development of citizenship, character and effective personality—in short, for the total development of people. Today's teachers no longer assume that whoever is well informed will also be good.

Because many successful people have often had an above average amount of schooling, it has seemed logical to believe that job success results only from the application of accumulated knowledge; the more we know the more successful we should be. This line of thought has convinced us that certain facts are necessary for success in any vocation or in life in general and, as a result, these facts have been made the central core of our curricula. By following a curriculum, the student will accumulate knowledge which should equip him for success in life. When students failed to learn with sufficient rapidity what we believe is important, we have thought that our requirements were not severe enough or that we had not used sufficient motivation.

This Method Is Now Doubted

Only recently have we begun to doubt the merits of this method of education. The assumptions of the older system have met with a serious challenge by research in the areas of "transfer of training," "latent



Today's teachers no longer assume that whoever is well informed will also be good.

learning," personality and others. However, these assumptions still affect our curricula and, consequently, the structure of our school buildings.

What Is Learning?

Is learning a process by which people accumulate factual knowledge which alone will aid in their success, or is learning but one aspect of the total development of a person? What should a person learn, and how important is the learning of self-discipline? Why do we have to know the needs of adolescents and what are some of these needs?

More and more, psychologists and teachers are accepting the view that learning is not a process but an aspect of the total development of a person. Teachers no longer are amazed that isolated learning results in little change in behavior nor are they blind to the obligations of schools for the development of other and equally important characteristics in their students. For learning to be effective, it must deal with people and with the solution of their problems; certainly not with a process.

This point of view is not new. What is new is our realization of the fruitfulness of the type of learning which occurs in today's schools and the congruence of the aims of our newer teaching methods and the aims of our democratic society. Today, few educators would disagree with the philosophy that schools exist for learners and their development and not for a process.

When learning is viewed in terms of a narrowly conceived end-product of the development of a skill or ability and is explained as a process, it logically follows that curricula should be devised in which opportunities are present for acquiring these skills. A final logical step is the construction of buildings to house these curricula. So we begin to think, in constructing buildings, of rooms for science laboratories, home economics, music, art, dramatics and so forth. When, however, we view learning as an aspect of development, we think in terms of buildings to house learners. No longer is it necessary to start school plant planning by thinking in terms of standard classrooms.

Planning for adolescents starts when we agree upon how they should learn. Instead of 750 square feet of space for 25 youth, 1,200 square feet may be required. Under such conditions there would be space for small group activity. Instead of separate classrooms, a group of four classrooms might be planned as a unit. Provision could then be made for flexibility of experiences and resources. Certainly, no educator would say that the construction of buildings can be considered apart from the needs of the people who will occupy them. To do so would be equivalent to building all houses alike for living, rather than building them to suit the different needs of the people who will live in them.

What should students learn? If learning is an aspect of development rather than a process, it is necessary to reconsider the designs of school buildings to the end that they may provide the best possible environment in which learning can occur. Most educators agree broadly on what it is that they desire public school students to learn. They would agree that adolescents who have completed their high school learning should be well grounded in the basic or fundamental tool subjects, that they should be able to live and work comfortably with themselves and with other people, and that their learnings should enable them to take their places as contributing members within our society. Educators agree that in order to accomplish these ends students must develop, among other things, traits of self-discipline. It is at the point of how we can best develop self-discipline that we part company—often with violent emotional overtones.

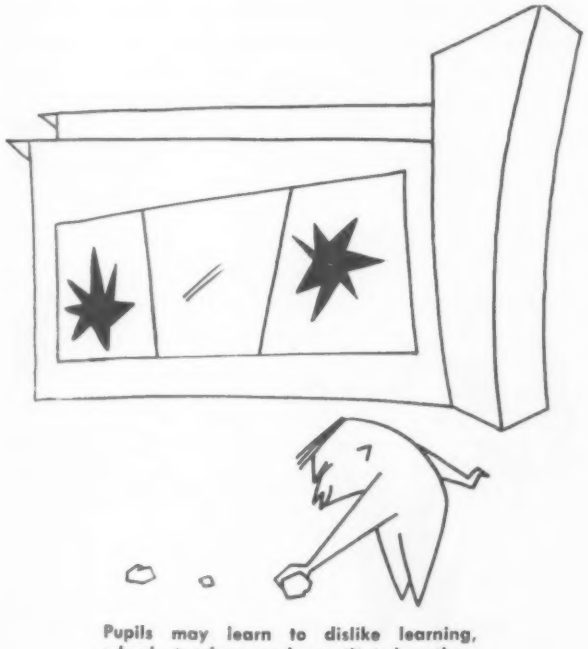
Developing Self-Discipline

How does self-discipline develop? One group believes that the best way to develop self-discipline is to require students to meet certain criteria and standards. This is best accomplished where the teacher is a strong leader who sets the learning requirements and judges the effectiveness of pupil behavior in meeting them. The emphasis in this philosophy is on curricular needs, motivation of pupils to satisfy curricular requirements, and measurement of attainment in respect to the requirements. The needs of students are studied in this frame of reference in order to offer more adequate motivation. The educators in this group believe that *habits* result from reinforced repetition and habits of good work will transfer beyond school situations. Students learn to form good habits by repeating their behavior and by being rewarded for their efforts. For this philosophy it is necessary to construct buildings which

will permit the maximum use of motivation, which will encourage pupils to learn curricular material and which will best house the curriculum.

The opposing group believes that learning is in *direct proportion to need*. Where need is absent so is learning. This group says that the fundamental need of people is to maintain and enhance self-organization and that people will do what they can to overcome or to avoid threat. Pupils will learn in order to avoid the threat of ridicule and failure but such learning is isolated and mechanical and does not serve functional purposes. Although pupils learn subject matter in this type of situation, they also learn other things that are not desirable. They may learn to circumvent rules and regulations and thus avoid accepting and learning responsibility. They may learn to dislike learning, school, teachers and constituted authority. Students may learn that they are not important as people, that they are inadequate and ineffective human beings. That is, they learn these unfortunate things unless they are even more unfortunate and develop defensiveness that will preclude those changes which we call learning. Furthermore, the content of that which is learned under threat is rapidly forgotten once the threat is removed, but the emotional learning lingers on.

This second group believes, furthermore, that the learning of adolescents far too often consists of what teachers are prepared to teach or of what has been accepted in the past as important, and not what the student needs to learn. Learning how to learn is ignored and relegated to a secondary position beneath what is learned. This group says that students learn how to learn in traditional schools almost by accident.



Pupils may learn to dislike learning, school, teachers and constituted authority; they may learn to circumvent rules.

This group also claims that formal, traditional learning situations when most effective lead to competition and emphasis only on individual accomplishments. They would argue that preparation for democratic living requires practice in working and living together cooperatively with people for the better good of the individual and the group.

From the point of view of the second group, habits are the results of satisfactions gained through behavior. When satisfactions change or disappear so, miraculously, do the habits. Habits are not ingrained, neurally determined, automatic patterns which a person follows blindly and passively, but the means by which people efficiently reach their goals—the satisfactions and rewards they seek. If behavior leads consistently to satisfaction or reward it becomes habitual, but if the behavior leads only to the removal of threat it will disappear when the threat is removed.

The Needs of Adolescents

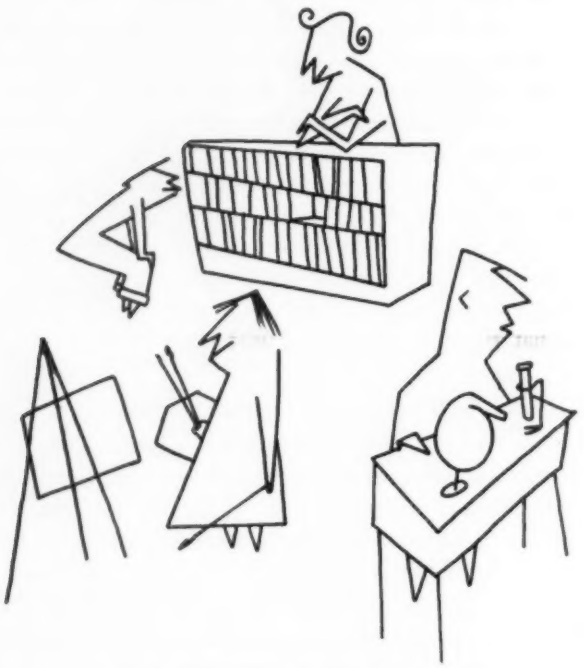
If we select the second alternative for our objective (and remember that this does not necessarily exclude what most educators consider to be the good in the first alternative), we see that it is necessary to consider, more seriously than we have, the needs of adolescents in the designing of school buildings. Spaces are needed in which people can work together in either small or large groups. Within an educational plant there may need to be a series of learning units in which approximately 100 people might work together for long periods. More able students could find learning opportunities within the larger areas and not be restricted by the present small classroom. A variety of learning resources would need to be available for these areas, such as library materials, work spaces, science materials and art supplies. Several teachers would serve youth in each area. Each child would work in one area for a major portion of the school day. The number of units would be determined by the size of the school. Specialized experiences might be provided elsewhere in the plant or in the community, as would eating, play and assembly.

The artificial segregation of each learning experience to which we have become accustomed may have created more problems than it has solved. By moving large groups of people about a plant at least once an hour, it is difficult to achieve warm relationships out of which grow security and acceptance. Through planning, numerous regulations would give way to a simple organization in which adolescents would share. Under such conditions the building houses youth and is used by youth and by their teachers in aiding their development, a significant portion of which is learning.

What are the characteristics of adolescents. Adolescence is a period of change—changes in perceptions of self, others, society and relationships to it; changes in physical stature, interests, attitudes, values and goals.

In other words, the adolescent is in a transitional period, he is changing from a child to an adult.

What are the psychological needs of adolescents? The needs of adolescents do not differ markedly from the needs of all people. When differences are evident, they are in degree of emphasis rather than type. The



Pupils should have a variety of learning resources for small or large group work.

needs of all people can probably be grouped together as the need to maintain or enhance self-organization. Physiologically as well as psychologically, people strive to grow or to enhance self-organization or, under adverse conditions, to protect or maintain the degree of self-organization or maturity they have already achieved.

In adolescence, as in early childhood, growth is rapid. Physically and psychologically the relationships of adolescents to themselves, other people and society in general are changing. A similar change occurred in childhood from the age of three or four to around seven or eight, when it became somewhat stabilized. The change from infant to child presented new problems of relationships to authority and responsibility. These changes resulted in negativism, insecurity and oftentimes problem behavior. The change from childhood to adulthood, which is called adolescence, brings similar changes. In fact, it can be said that all of the problems of the young child are repeated in early adolescence, and to make matters more difficult, new problems peculiar to this stage in development appear.

Problems of Adolescents

Most of the new problems of adolescents center around social and family relations. Imposed authority brings negativism at home and at school. Demands for conformity produce resistance when these demands are interpreted as barriers to growth. The imposition of adult views and demands for adult behavior often yield hostility and rebellion. Where teachers talk about the satisfaction of future needs to pupils who require immediate need satisfaction, negativism will be at its height.

Accompanying the transition from childhood to adult status are basic changes in attitudes, perceptions and values. The child slowly and sometimes reluctantly yields his more individual values for the social values of adults. But he does not enjoy relinquishing them permanently—at least at first. He must feel free to be an adult when he wishes and in the next breath a child if he so desires. He may want to be grown-up at times, but he often feels inadequate in this new role and then wishes to enjoy childhood protection for a little while longer. Vacillation is rapid and a common trait.

The adolescent is moving from the adult imposed conscience of childhood to the self-control of an adult. He must take on a new and unique set of values. Since many of these values relate to people, they should be developed in an environment of friendly and warm interaction.

Adolescence is another step in growth toward democratic living. Much of the negativism of this period results from the interpretation of adult rules as infringing on opportunities to become a responsible adult. Adult rules are as apparent in school life as in any other area of adolescent living. Certainly, teachers



The adolescent may want to act grown-up at times, but is often inadequate in this role.

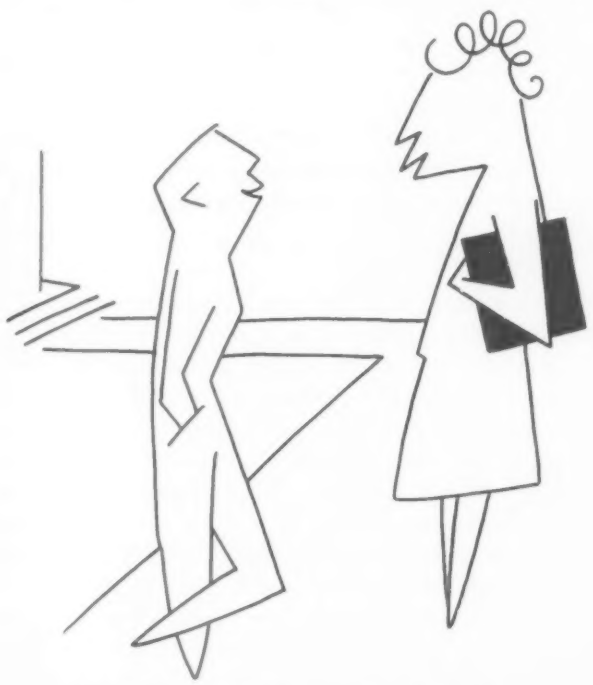
have the power to effect or cause emotional behavior, and the power to control or impose demands for desired behavior upon the students. Often, teachers demand that pupils be submissive while they impose

adult views and needs on them. As interaction among pupils and between pupils and teachers increases, the arbitrary power of authority decreases.

Many of the problems existing between teacher and adolescent result from faulty communication. Teachers do not always understand their pupils and pupils have little opportunity to gain understandings of their teachers. The lack of communication between teacher and student is due, at least in part, to their faulty perceptions of each other, for neither understands adequately the needs of the other. Training in democratic living requires opportunities for interaction with people and freedom to manipulate the environment for purposes of learning. Where opportunities for interaction exist, there too exist opportunities for developing realistic perceptions upon which to base democratic living.

Adult Guidance

Closely allied and possibly basic to democratic living are the needs for security, friendship and affection. The adolescent must learn about people so that he can live in harmony with them. He needs opportunities for close, friendly relations and in these warm relationships he can grow in his knowledge of himself and of other people. By far the largest number of adolescents need to talk over their problems with some understanding adult outside the family circle; they are eager for adult guidance which will help them to arrive at a philosophy of life, a religion or a code of ethics. The most natural people for the adolescent to approach are the scoutmaster, the pastor, the camp director or the teacher. He must have access to his teacher in a natural way when he is confronted with problems. He cannot delay for an appointment and formality may erect an impassable barrier. In an environment of security and acceptance where opportunities for expression are present, most of the personal problems of adolescents disappear.



The adolescent must have access to his teacher in a natural way when confronted by problems.

Adolescents have strong group feelings which may display rapid fluctuation. They both like and need opportunities to meet with their own sex and sometimes with both sexes present. Sometimes they enjoy and benefit from large groups and at other times they badly need the security of smaller groups. To meet these needs, their environment must be flexible.

Heterogeneity of Adolescents

Adolescence is characterized by heterogeneity. Intellect, interests and abilities show far greater variability than they did in childhood. A narrow curriculum cannot provide the opportunities needed by these people. To develop pride and interest, a person must be able to feel that his interests and abilities are important and that they can effect change. Adolescents must be able to think and know that they are capable of making really worthwhile contributions. School situations cannot always care for the heterogeneity of pupils nor can they always provide opportunities for meaningful contributions. People of all ages must be able to feel that they are contributing to the group in which they live. Adolescent people must feel certain that they have a meaningful place in their society and that their contributions can effect desirable change. To insure these needs the school must go to the community and the community must come to school.

The Physiological Needs

What are the physiological needs of adolescents? The growth of adolescents is also reflected in rapid physical changes which produce their own unique problems. Again, heterogeneity is the keyword. Some adolescents enter their period of physical growth early; others at a later period. Within any one class all manner of variation from childhood to adulthood are present. Variations in stature present problems in design and furniture. Chairs may be too large or too small; chalkboards too high or too low.

Different rates of sexual maturation produce significant problems. The early maturing boy is at an advantage with his peers but if a boy matures late he is out of step. If he matures early, he is better able to perform the activities which are valued by his group and he thereby receives acclaim. On the other hand, the early maturing girl is at a disadvantage.

The early maturing girl finds herself embarrassingly tall and heavy. Embarrassed by a greater development than seems to her to be normal, she is handicapped when she attempts to participate in the active playground games which are still within the in-



Variations in stature present problems in design and furniture. Chairs may be too large or too small, chalkboards too high or too low.

terests of her classmates. The early maturing girl is below average in prestige, sociability and leadership; below average in popularity; below average in cheerfulness, poise and expressiveness. In the opinion of her classmates, she is considered to be rather submissive, withdrawn and lacking in assurance.

To a considerable extent the difficulties of the early maturing girl are due to the age-grade system of our public schools, which make a physiologically deviate child conspicuous among her classmates. This would be less likely to occur in a modern school which can make flexible provisions for individuals or, indeed, in the old-time district school, in which grades are mixed in a single room. A completely heterogeneous grouping, as in the latter instance, may have disadvantages from a teaching standpoint, but for both early and late maturing children it may carry great advantages from a social standpoint.

The late maturing boy has his unique problems. From his point of view he may see himself as abnormal. This feeling may be strengthened when comparisons are made in the locker room or in the lavatory. We have long recognized the need of girls for privacy but have been blind to this need in boys.

The late maturing boy may find physical competition with his more mature peers to be demoralizing. He may seek to escape and in this escape fail to achieve the social contacts needed for his total development. He may reach an awkward stage in development after his peers have achieved coordination. He will thus need opportunities for developing coordination at a level suited to his ability, and perhaps opportunities for escaping imposed physical activity until he overcomes some of his self-consciousness.

The Path to Adulthood

Physically, then, as well as psychologically the adolescent is in a state of transition and transformation. Variability and heterogeneity are the keywords by which he may best be described. He is growing and in suitable environments this growth will lead him to a mature, democratic adulthood in which he can be an important, contributing member of our society.

Adolescents cannot be considered young adults. Their needs require programs and facilities designed to fulfill them. As our understanding of these needs increases, we must be prepared to change our concepts of educational programs and facilities. From the evidence at hand, it would appear that the keynote for planning should be flexibility. We must find new ways to allow adolescents to grow and mature normally in an environment free from severe restrictions.

Weber Associates



Many specialized courses have crept into the curriculum of secondary schools. Driver instruction is among the new subjects and has a wide popular appeal.

CHANGING SECONDARY SCHOOL PROGRAMS AND THEIR IMPLICATIONS FOR DESIGN



by G. ROBERT KOOPMAN

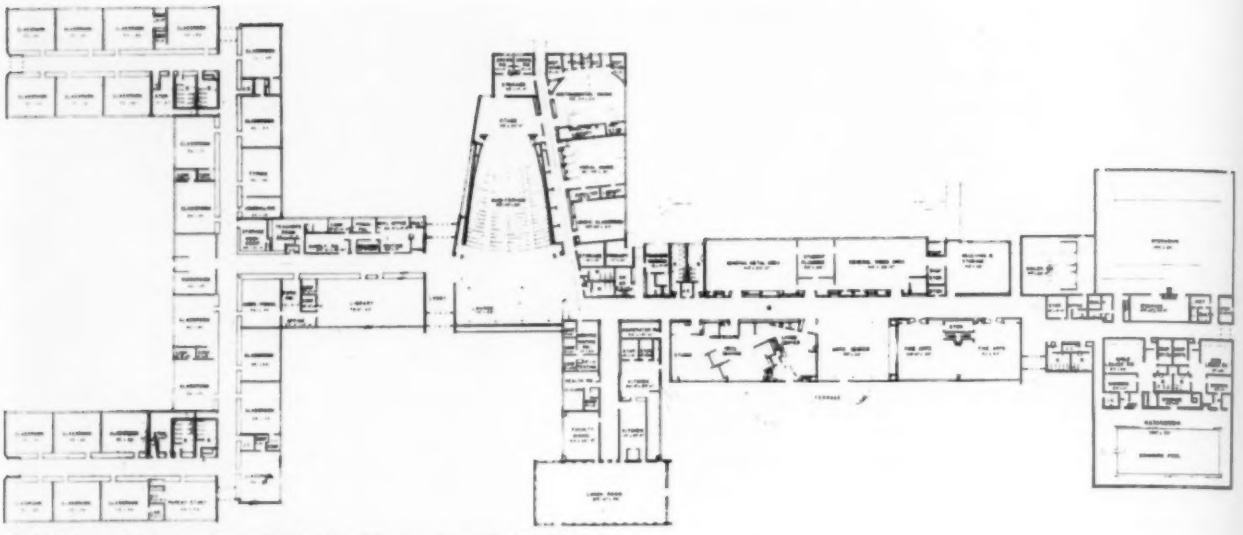
Associate Superintendent, Michigan Department of Public Instruction, Lansing

Mr. Koopman has been a public school teacher, principal, supervisor and school superintendent, as well as a research fellow for the General Education Board and in charge of cultural affairs for the Office of the U.S. High Commissioner in Germany. He has an A.B. degree from Central Michigan College of Education, an A.M. from Teachers College, Columbia University, and an honorary doctorate from the University of Palermo. Mr. Koopman served during both World Wars and was awarded a Bronze Star and Military Order of the British Empire.

EDUCATIONAL planning is part and parcel of planning in general whether it be on a city, regional, national or universal scale. To accomplish good planning one dare not skip over any fundamental principle or miss any sharp angle that may be developing. So in this "look" at changing secondary school programs the approach should be broad enough to encompass all factors but specific enough to provide help for those who must make practical compromises between dreams and pragmatic conditions. The professional workers involved in planning and designing school plants may suffer from the lack of creativity of our age and the limitations of tradition, materials and means—as expressed in dollars or in the machines and fabricated items dollars buy. However, they need not suffer from lack of essential information.

The secondary school is something between a folk elementary school and an institution of higher education. Such schools are either junior secondary schools, three or four-year senior secondary schools, six-year secondary schools or community (junior) colleges. Some are publicly administered and others are administered by non-public agencies. Many are tiny rural neighborhood institutions while others are specialized vocational high schools. In a broad sense the functions of all of these schools are similar but actually they vary from community to community and from level to level. Most senior schools, whether those with three or four-year programs or community colleges, are involved to some extent in adult education. Many participate in recreation programs.

Nearly all of the *junior* secondary schools are actually representations of the American variety of an advanced folk elementary school. Some people would like to see them openly reclassified in name and function. These "junior" high schools are, however, unques-



A 1954 model for a junior high school is the O. L. Smith School, Dearborn, Michigan. Architects are Jahr-Anderson Associates, Inc.

tionably popular and unquestionably more effective in meeting *basic* needs than are the senior schools. Of course, their problem is simpler than that of senior schools and community colleges because they are not called upon to meet so many highly specialized needs of learners.

Changes in the instructional programs of junior secondary schools have come about much more rationally than in the senior schools. Junior high schools make some attempt to carry out a balanced program of education. They have consciously attempted to adapt their programs in order to meet the imperative needs of American youth. Forty years of junior high school development show that homeroom organization is the rule. Study halls are losing favor, and guidance has been incorporated into the instructional program. Many junior high schools have core programs based on block scheduling.

A Global Look at High Schools

Before examining the trends in the senior high school program it might be well to look at the school and community globally. What is this American secondary school? Is it a youth center, a college preparatory school, a vocational school, a recreational center or an adult educational institute? Or is it a mixture of all these? A study of issues and functions of secondary education was made in the 1920's by the National Department of Secondary School Principals but has not been repeated. Accurate descriptive studies of the developing secondary schools are quite inadequate yet the institutions concerned are too common to be altogether mysterious. The American secondary school, in 1954, is far from being just a preparatory school or simply an upward extension of elementary education. Nor is it yet the American Peoples College.

A final introductory idea must be a reference to process. Process may seem to be a sort of intangible in this situation. This is because the processes by which programs are developed and evaluated have a significant role to play in determining the content, efficiency and public support of the program. When children, teachers, parents, members of taxpayer leagues, employers and school board members all enter into planning the program such a product must embody new content and receive more community support, criticism and understanding. Also, such a program will be more amorphous than the one planned by the high school principal of yesteryear in his office during Easter vacation.

Major Program Trends

Curriculum experimentation in secondary education was quite widespread in 1940 but World War II brought this activity to a virtual halt. Extension of the scope of the curriculum, however, goes on apace. Vocational education, driver education, conservation, consumer buying, safety education, home management and new courses in general education are being added. While there is little curriculum reorganization on any major scale some traditional courses disappear every year and their enrollments are shrinking rapidly. Curriculum change is like dermic change in man—the new layer pushes the old layer off.

The cafeteria-like character of the secondary school curriculum is often stressed—and to liken the elective system to a cafeteria is not unfair. However, the facts show that while it is unintegrated there is a solid core to the curriculum. What do the figures of competitive enrollments show?

1. English, social studies and health, safety and physical education are way ahead of other fields when it comes to competitive enrollments.
2. Broad subject fields enroll more pupils in the



Gabriel Benzur

It has been found that physics and chemistry are taught in less than half of the secondary schools of the nation. Most new school buildings, however, do provide for science instruction, as does the Carver Heights School in Columbus, Georgia. Aeck Associates of Atlanta are the architects.

junior than in the senior high schools. In other words, the programs of the senior high school and junior college are more fractionalized.

3. Home economics and its curricular twin, industrial arts, are the greatest ground gainers as compared with the broad fields of general education.
4. Generalized courses within the broad subject matter fields are pushing the specialized courses out and upwards.
5. Physics and chemistry are taught in less than half of the senior high schools.
6. French and Latin are the greatest losers. Spanish gains but still has a small enrollment.
7. Enrollments in mathematics in grades ten, eleven and twelve have decreased sharply during the last decade.
8. Camping and occupational programs of work experience involve a small percentage of pupils but are increasing in number, enrollments and types.
9. In recent decades vocational subjects have changed the nature and some of the functions of secondary education but enrollments in recent years have not been expanding. Business education, which is not purely vocational, has large enrollments. Other vocational subject areas tend to increase in scope but do not have a large percentage of the total secondary school enrollment.
10. Integrated programs of general education such as "core" programs are widespread and have small enrollments, but are growing steadily.

Sensational Program Trends

The Core Curriculum Idea. The substantial common elements in the offerings and takings in the secondary school curriculum have already been mentioned. This core consists of social studies, English, health education, safety education and physical education. The attempts to integrate the experiences into one program to be taught in a ten or fifteen-period weekly block schedule by the same teacher are very significant. Actually this trend only involves a few (approximately 5 percent) of the pupils in American secondary schools. It is under considerable criticism due to its newness, the difficulty of re-educating teachers tailored for the traditional school and to the weaknesses that often occur in a new operation. Again, the junior high school has more experiments than does the senior high school. Nevertheless, the trend continues and gains acceptance. Teacher educating institutions are giving it an increased recognition and, as research findings on growth and learning are applied, the new method and organization receive additional support and attention.

This movement has been referred to as a search for an effective general method of teaching. More often, however, the scheme is advocated in terms of a more effective organizational plan as it pertains to time and subject matter. To some it is the essence of education. The core of common subjects runs through all six secondary grades, to some extent, but appears most frequently in the seventh, eighth and ninth. The need for reorganized general education is commonly recognized in all levels up to the graduate school.

The claims made for the core program are fundamental in nature—so fundamental that they threaten both common practice and traditional attitudes of laymen and educators. Hence the furor. The core classes deal almost universally with the following activities:

1. The substantial core of the secondary school—English, social studies and health education, minus physical education
2. Guidance—individual and group and the homeroom function
3. General science
4. Student affairs and government, minus, of course, strictly all-school activities

Mathematics is often found in the core of the junior high school and a few other subjects occasionally.

Two related trends should be mentioned. Several schools have introduced into the single period class some general method of dealing with student needs. A one-period class in social living is a good example. This method, which calls for no change in organization of the schools, is much more feasible than the block schedule, but still does not seem to spread much, probably due to the way teachers have been educated. It is based on a non-traditional concept of subject matter and teaching method.

The Little School Idea

Another trend based on attempts to meet real needs of pupils without disturbing subject matter is called the "little school" or "suite" idea. It is an adaptation of the old "house" and "college" practices in higher education which have been and are demonstrated in this country and Western Europe. These two trends should be watched and carefully evaluated even though they answer only one, or at best two, of the several problems attacked by the organization and method exemplified in the self-contained classroom.

Work Experience and Year-Round Schools. Work experience and year-round schools have great fundamental imperatives for program and plant planning. They clash definitely with folk values and practices and thus gain ground slowly. The year-round school is little more than a persistent idea. Work experience programs are increasing sharply due to a forced draft provided by subsidies and aid to vocational types, but actually they are not very extensive. The claims made for these programs are so fundamental and experience to date so rich in good results that the trend must be taken seriously and watched carefully by anyone concerned with educational planning.

The two ideas of work experience and year-round school are not essentially related but have many similar implications for program and plant planning.

Sociality in Secondary Schools

The American secondary school is no longer a place where a certain number of classes are recited. A great sense of community exists within the secondary school. Gradually in more and more schools, and with less reserved areas, these communities are becoming self-governing organizations.

The earlier movement toward extra-class or extra-curricular activities is embraced in this new movement which correlates so well with folk developments in lodge, church, labor unions and farm organizations. This trend is generally accepted as desirable by all concerned. Even the senior high school teacher who believes in "hard" education usually goes along with the trend. And indeed it provides important learnings for young people who will live in a democratic, gregarious society. Homerooms, canteens, commons, student council rooms, conference rooms, enlarged corridors, patios, multi-purpose rooms, cafeteria rooms designed for parties and dances, foyers and studios are some of the manifestations that receive approval by all but a few truly atavistic persons. These developments do not seem to imply a changed method and a changed role of subject matter. Thus the most reactionary principal often becomes enthusiastic over these developments in social living and learning. This trend is unique because it is essentially non-controversial.

More Classes for the Youngsters

A rather simple trend deserves mention. Years ago some high schools eliminated study halls and increased the number of classes per student. More and more



Chas. R. Pearson

Enrollments in home economics courses have steadily increased. This room is in the South Central Junior-Senior High School in Seattle, Washington. Ralph Burkhard is the architect.

secondary schools are moving in that direction. The practice is seen as an economy of space but more as an enrichment of the program of the individual student. While physical education was already required in many schools this practice gives children a chance to have more experiences in courses such as music, art, speech and advanced science and mathematics. This trend may gain momentum during a period of growth and replanning since it requires no restructuring of the curriculum.

Implications for Design

The designer must reconcile several factors. He must deal with physiological implications; with social purpose, with efficiency—in this case educational efficiency; with acquired responses in the form of tradition; and lastly he must deal with a client-employer in an ethical and helpful manner. There are at least three approaches to design implications—the theoretical; the approach based on program trends objectively measured; and the kind of compromise group thinking approach that the designer and his client-employer engage in. Actually, all of these are important and should be used simultaneously. Much fine work has been done with problems such as space, light, safety and circulation. Certainly the data presented herein on program have implications for all these matters.

Change in Function and Scope

It is clear that the function and role of the secondary school in American society are changing. Some think that a great change will occur in the near future but that is pure conjecture. It is safe, however, for designers to assume that the American secondary school is something like a fast-growing adolescent—a bit out at the wrists and ankles. It is safe to assume that the program is becoming much more related to the community. Surely something more is required than a gate separating the auditorium and the gymnasium from the remainder of the building. A radical view would be that of the secondary school plant composed solely of offices, studios, auditoriums, gymnasiums, forums and playing fields, and even the shops and assembly places of the community might be redesigned somewhat for educational purposes. This is admittedly too radical but the wise designer will not wish to be caught short before the building is completed. If the trends toward work experience and the year-round school maintain and extend themselves, the giant building wings for specialized purposes may be less needed. In any case, planners should give great attention to the total organization of the community school system and to the function of the secondary level.

In regard to the purpose, organization and scope of secondary education no problem is harder to "figure" than the junior college problem. Big developments are in the offing. Population increases and cultural changes indicate that some institutions will be established. State support and control, function and scope of curriculum, relationship to community education are all under study. Each community must at present face this problem in terms of state policies and local conditions with the sure knowledge that the problem cannot be sidestepped much longer. The planning of these colleges represents the real frontier in secondary school design.

There is considerable evidence that a form of city planning that deals more with people and educative processes will grow. Old cities must be redesigned at the core. Suburbs and new cities must be planned with a view to the community curriculum. As secondary school facilities are extended they must be considered in city planning—not stuck in to fill up the gaps.

Health and Operational Efficiency

Concepts of health and operational efficiency must be greatly broadened. It is axiomatic that the structure must not impose operational strain on the individual. Yet our secondary school plants seem to be designed to impose such strain. But the new factor in this situation has to do with mental hygiene and sociality. If the secondary school is, as alleged, becoming a community, it must be designed for these purposes instead of as a



More and more students are enrolling in camping courses.

place where a set of classes are held. European high schools, including the newest ones, reflect clearly what kind of a plant is built when this principle is rejected. Even the Schuldorf Bergstrasse in Germany, a new community school, only plays with the principle.

Circulation, space, ventilation and lighting should all be re-thought in terms of the learning values inherent in a program that seeks good mental health as well as good physical health; good human relations as well as obedience to necessary regulations.

Recent attempts to have a social center in the circle and a lot of classroom wings around the center

may well represent only an obstacle to future progress. Some more thorough-going solution is indicated but no one has produced it as yet. A great prison is one kind of an institution, a shopping center is another, and a place where learning, fruitful living and growth must be particularly emphasized is still another. Here is a challenge closely tied up with the application of our political theory and way of life as well as with an epicurian type of satisfaction.

The Importance of Flexibility

The amorphic nature of the curriculum makes flexibility and design extremely important. The data on competitive enrollments and the descriptive material on trends both add up to the same conclusion. Significant if more or less minor trends are taking place—minor as compared with the change of purpose. The acceptance of such flexibility as the module permits is surely not enough. Movable walls that will never be moved make good talking points but have little significance. Large open suites for home economics still represent a stereotyped program in most new schools. A wing for this and a wing for that represents a limited amount of flexibility and considerable future inflexibility. Probably the idea of a roof supported at the four corners by weight-bearing uprights is a bit ridiculous but it may indicate the direction in which we are going. There is need for careful research on the different aspects of flexibility rather than a general, pious acceptance of the principles of flexibility which to date has netted us very little in the way of servicing the more advanced programs. The question of flexibility is closely tied up with the problem of the unit organization for learning and should be so treated.

Services and Ancillary Aspects

At the present time there is some useful tinkering with the nature and placement of the servicing and ancillary aspects of the secondary school plant. Someone recently proposed that the principal's office should be in the "cellar" if the school had to have a cellar. Attempts have been made to build a social center around the library. Patios to enhance social living have been suggested and indeed constructed. Magnificent foyers of great utility have begun to appear. Naughty "coke rooms" have been proposed. Equally obnoxious smoking rooms, reminiscent of the tobacco-producing region, have been toyed with. The nature of the growth of the program is such that it is likely that developments in planning the service and ancillary spaces and facilities will tend to lag behind those of the unit organization of the school. But experimentation is still a good thing and much good should come of it. Planning these features should take carefully into account the factors of social living and the servicing of the unit organization whether it be a homeroom, a suite, a core room or a wing of a building.

Unit Organization for Learning

The data about the changing secondary school program make it clear that there exists a substantial common element in all secondary school programs at all levels. The element may be described as social living (basic communicative arts and citizenship education) plus health education. Or it can be pictured in standard terms such as English, social studies, health education, safety education and physical education. But there must be some solid implication for design in the fact that the core exists. The amount of research being done in the field of general education and the acceptance of the term general education in any one of its three or four major meanings are evidence that there is an important consideration here for the designer, whether he be an educator, an architect, an engineer or a rank outsider.

Cultures are sustained and enhanced by the validity, strength and vitality of the core of their educational programs whether that be the early quadrivium (and the core isn't so different from this as some imagine) or whether it be the arts of spear-slinging and wife-stealing, or conformity to some religious ritual. Actually no problem of design is more worthy of serious study than this problem of how to design for the common elements in the educational program. And stressing the importance of the common element in no way slights the importance of all of the special program aspects that go to make up the total program of a secondary school that serves the most advanced, wealthy and complicated culture the world has ever seen.

As has been indicated, the core curriculum or self-contained classroom idea gives one something to work with—something to cut his teeth on. It is, no doubt, an over-simplification to say that a good secondary school should consist of an office and a string of self-contained classrooms. But this is an attention-drawing device like the structure with a roof and four uprights, or like the community college that is nothing but a set of offices, television rooms, libraries, studios and shops. It is around these basic concepts that inquisitive and fumbling human minds may through grace and fortuity achieve something noble and beautiful and useful.

A HIGH SCHOOL DESIGNED FOR THE FUTURE



by J. DON GARRISON

Superintendent, Norman Schools, Norman, Oklahoma

Before becoming the superintendent in Norman, Mr. Garrison served the public schools of Oklahoma as a football coach, teacher and school principal. He was an enlisted man in World War I and a Lt. Colonel and Colonel during World War II. Mr. Garrison has B.S. and M.Ed. degrees from the University of Oklahoma.

As an aftermath of a population greatly increased during the war years, the Norman school system found it necessary to lay plans to care for its rapidly increasing enrollment. After a study of the existing facilities of the Norman schools, the Board of Education reached the conclusion that the interests of education in the district could best be served by the construction of a new high school and additional elementary schools.

Having purchased a 40-acre site for a new high school, the Board of Education appointed a citizens' committee to study a list of some thirty architectural firms who were interested in designing the building. This committee was instructed to recommend five firms from the list of applicants for the board's final consideration. From the five firms recommended to it, the board jointly commissioned the firms of Perkins and Will of Chicago, Illinois, and Caudill, Rowlett, Scott and Associates of Bryan, Texas (now also of Oklahoma City, Oklahoma), to design and prepare plans and specifications for the new high school building.

Before any planning was done, the architects held many conferences with the superintendent, the principal and high school teachers to discuss present and future high school programs and problems. After much study and numerous conferences, six salient considerations were evolved for designing the Norman High School. They are as follows:

1. *That the high school population will continue to grow and that the curriculum will continually be changing:* Therefore the school must be designed so that it can be expanded economically and efficiently without marring the beauty of the school.

2. *That within each individual teaching area, such as homemaking, English or speech, there will always be changes in teaching techniques:* Therefore classrooms, laboratories and shops should be designed for economical and efficient adaptations to these changes.

3. *That high school students will spend as much time in halls (over an hour a day) as they do in any one classroom or laboratory:* Therefore halls and other circulation elements should be designed to help achieve the aims of the educational program.

4. *That a well balanced, effective program of education will accent communication among students in the classroom as well as communication between the teacher and the student group:* Therefore teaching areas should be designed to allow flexibility of seating arrangement.

5. *That the school plant will be used the year around for community improvement, education and recreation:* Therefore the school plant should be designed to facilitate community use. Translated into

The cafeteria (background) and shop flank the social court on the east wall of the Norman High School. These are the only two areas where direct sunlight penetrates into the rooms.



Hedrich-Blessing



The columns at right effectively separate the lounge of the Student Center from corridor traffic. The library is at left, the office in center background. The open locker area is just off the lounge area and has 684 cages for books and papers and hanging space for as many coats.

planning techniques, this means proper zoning of the main architectural elements. For example, this includes elements which are to be used by both students and the public, such as the gymnasium-auditorium, and which should be grouped in one zone for efficient use and economical maintenance.

6. That the school plant should be a real social center for the boys and girls of high school age: Therefore the school plant should be planned and equipped in such a way that the students will consider it the most desirable place in the community to learn, work and play.

A Building Which Is Different

As a result of their study of Norman's high school needs, the architects brought forth plans for a school building which is quite different in design from other high school buildings in this area and probably in the entire country. The building has a foundation of reinforced concrete construction with grade beams resting on drilled bell-type footings. The auditorium-gymnasium section is of steel frame construction with nonload-bearing walls, while the classroom section has steel columns and laminated wood beams with nonload-bearing walls. (Originally the plans called for steel frame construction throughout the building, but because of the steel shortage existing during the Korean War years, a government steel allocation for the entire

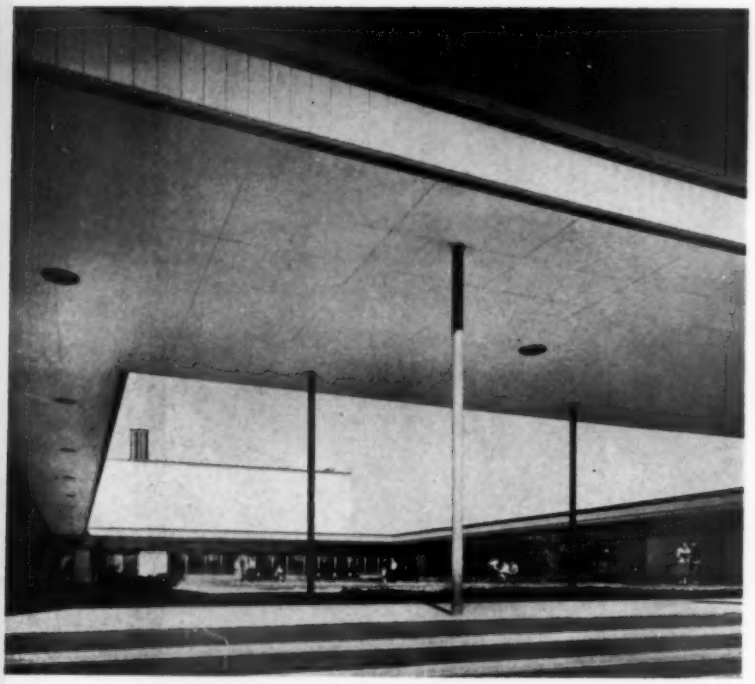




This corridor runs from one end of the building to the other. Top and bottom sections of the windows are vented for cross-ventilation through the classrooms at right.

The floor of the Norman High School is cantilevered out from the north wall and provides a seating ledge for students. Classroom partitions also extend outward and shut out undesirable sunglare.





The Norman High School has two courts. This social court is in constant use by the students for study, discussion or just relaxation from the school routine.

building could not be had.) The floors of the classroom section are two feet off the ground on precast joists with poured concrete slab covered with asphalt tile. Classrooms are equipped with plastic ceiling domes to provide natural light.

The building is heated by a steam system incorporating both unit heater-ventilators and convector type heating. The system is equipped with automatic day and night pneumatic controls.

The classroom section is largely a glass-walled building. Perimeter rooms on the north are provided with glare-reducing tinted glass, a roof overhang of 4½ feet and outside glare barriers between classrooms. Walls on the east and west ends of this section are of pink brick construction. Classrooms are in the main 28 feet by 28 feet and 24 feet by 32 feet in dimension. Flexibility to meet changing needs is accomplished by the use of nonload-bearing partitions which can be moved with little effort.

The auditorium-gymnasium section is of pink brick construction. A power controlled folding partition is provided in the gymnasium so that boys' and girls' physical education classes may be held concurrently. A large "student center" adjoining the library serves as a periodical reading room for the library and a waiting room for the administrative offices.

With a new building located on a 40-acre site the Norman High School can now carry on a very extensive academic program and a physical education program which serves every pupil in the school.

After a Year of Use

After having used the Norman High School building for one year, all agree that some very desirable results have been attained, not the least of which are the spirit and friendliness of the student body. Students seem to be as much at ease at school as they would be at home, and display the same hospitality and pride in their surroundings. A good teaching staff and a well knit educational program have had much to do with the school atmosphere, but the effect of a bright, open, cheerful environment cannot be overestimated. The whole school—the student center, the social court, the locker area, the cafeteria, the corridors, the ledge along the north side—offers an invitation to sit down and relax for a minute. Yet there is no loafing; instead the students seem to take full advantage of their surroundings during their free moments.

Pupils' Work Improves

It is believed that Norman High School is an example of the results obtainable when architects and educators work together toward an intelligent interpretation of a sound school program. Grouping of lounge, lockers, court and corridors provides an indoor-outdoor relationship. It is almost impossible to feel depressed in the building, even on a dull day. The cheerfulness seems to be infectious, and as a result it seems that the quality of work done by our pupils is improving.

SOLUTION FOR NEW SECONDARY SCHOOLS —THE CAMPUS PLAN



by ELMER H. GARINGER

Superintendent of Schools, Charlotte, North Carolina

Dr. Garinger obtained his bachelor's degree at the University of Missouri and his M.A. and Ph.D. at Teachers College, Columbia University. He began his educational career in Missouri and came to Charlotte, North Carolina, as high school principal in 1921. He later became associate superintendent and then superintendent. Dr. Garinger has taught summer courses in educational administration at the Universities of Missouri and North Carolina, at Clark University and at Peabody College.



and JOHN E. FRENCH

Principal, Myers Park High School, Charlotte, North Carolina

Before becoming principal of the Myers Park High School, Dr. French taught in California and Michigan and held administrative posts in Mississippi and North Carolina. He served with the U.S. Air Force during World War II. Dr. French has an A.B. from the University of North Carolina and A.M. and Ed.D. degrees from Teachers College, Columbia University.

THE current interest in the so-called "campus" type of secondary school is one that is not too difficult to understand. The New England preparatory schools and colleges, themselves, have had such arrangements all through our educational history. Perhaps the phenomenal growth of the secondary school in recent years has caused this departure in design to become so much a center of interest. Obviously, however, professional school people should not become over-zealous or wedded to any one plan believing that it alone can provide the best educational environment for the job to be done.

Even in the construction of homes, designs have varied from place to place and from one period to another. In our history and story books about other lands or other times we are familiar with the idea of the home in which the family, the pigs and the cows all inhabited the same structure, with the upper part of the building being reserved for the family. Evidently, in this country our farm families soon got away from this idea and built their barns and their machine sheds as separate structures from their human living quarters. They probably did it for two or three reasons. They thought it more sanitary and more inviting because they got the animal noises and odors away from the place where the family lived. They could also erect barns and sheds at less cost per square foot than was the case with the home, because the needs were somewhat different and a cheaper type of structure was satisfactory.

Today there seems to be a reversal to this early practice in some measure, and in the ranch type home we see carports built as a part of the dwelling. Here again, the type of structure has permitted variations in the kind of building and has made it possible to add on a unit for the cars or for storage which once might have been in a separate building.

The point that is being made is that architects and those who use buildings are still searching for an answer to the question of what is the best design for a particular building. Obviously, the design which the campus type school has taken today is not the ultimate. It represents but a stage in the development of this plan, and it is not entirely new. The idea of building a central core unit for a large group of perhaps 100 to 200 pupils with smaller conference rooms and labora-

A covered walkway connects buildings of the Myers Park High School, Charlotte, North Carolina. J. N. Pease and Company, architects.



Joseph W. Molitor



Library of the Myers Park High School. Listening booths are seen at the far end.

tories surrounding the larger space definitely has an appeal. It emphasizes the importance both of general education and specialized education. Much more thinking in this direction may prove to be highly productive for "life adjustment" education. Such a change involves further study of facilities both for the core area as well as for specialized areas.

Myers Park High School

In the experience of the Charlotte, North Carolina, school officials with their Myers Park High School, J. N. Pease and Company of Charlotte, architects, they have been favorably impressed with its reception not only by visitors, but also by those who use it—pupils, teachers and parents. The disadvantage of slow circulation of pupils between buildings is not as great as one might expect. The experience of three years has demonstrated that a seven-minute interval between classes is quite ample for students to get from one building to another. In the ordinary compact building in which all units are together an interval of four or five minutes is usually allowed.

Myers Park students feel that the advantages of the distributed school plant more than outweigh any differences in time. Actually, the administration is operating on a five-minute interval; and teachers show a leniency for those pupils who have great distances to go and cannot arrive exactly on schedule. There appears to be a distinct advantage in spreading out the adolescent population and getting a group of 1,000 to 1,500 students into a number of smaller units. There seems to be better circulation and less horseplay than is the case when the whole student body is concentrated in one place.

Another advantage that stems from the campus type arrangement is that each building can be placed at the exact location on the site most advantageous to its purposes. For example, the science buildings at the Myers Park School are at a particular place in the forest where outdoor planting is convenient and where cooperation with the trees and the running brook is easy to arrange. The building for the teaching of art will be on the site of an old cotton-oil mill, a most attractive and inviting place for young people who want to paint and who may be inspired by the immediate surroundings. The definition that one school consultant has given to the proper size of a classroom is that it should be about 2,000 square feet in area with half of it enclosed. This requirement is not too difficult to obtain with buildings distributed over a site in such a



Maximum advantages of the 76-acre site are secured by the open arrangement of buildings of the Myers Park High School. Buildings at the far left are the physical education unit and field house. Next are the student center, amphitheater, auditorium, language arts and social studies units. At the right are the buildings for science, home arts, biology and art.

way that the maximum of the out-of-doors can be obtained.

Architecturally the campus type of school plant has a special appeal to school people. In most cities, school populations have been growing rapidly, far more rapidly than even the most visionary anticipated. Old plants have had to be altered to meet growing needs and changing notions of the function of good schools. In these old buildings school administrators have had to provide more space for science departments, for libraries, for the music department, for the cafeteria, for shops and for other activities. No one knows the difficulty of trying to make alterations in old buildings to meet these changing needs unless he has tried to do it.

Additions and Alterations Easier

If the community has its plant in terms of separate buildings representing the major functions of a school program, alterations and additions appear to be much easier to make. In the case of the Myers Park School, for example, another unit can be added to an already existing building; or an entirely separate building, reached from the first unit by the unobstrusive device of a covered way, canopy or bridge, can be used.

Two new buildings are under construction now for the Myers Park School, a technical building and the business and mathematics building. The addition of these two new buildings represents, in practice, the participation in planning of pupils and teachers as well as school officials and consultants. Numerous conferences were held with pupils and teachers giving them an opportunity to make suggestions for the design of classrooms, and seeking their judgment on the kinds of

Opportunities for social gatherings are important for the school's young people.





After school sessions at the soda fountain in the student center appeal to many.

equipment and furniture most satisfactory for teaching and learning. For example, both pupils and teachers expressed genuine satisfaction with conference and work cubicles as part of the classroom and for running water in every classroom. This democratic planning by the entire group enhanced the interest of all parties in their school plant and secured what appears to be a more satisfactory building.

Trees, Contours and Spaces

Architects have defined their subject as "space enclosed." Most people who see the campus type of school plant are pleased with its appearance. The design permits the architect to make use of his own initiative and architectural desires. Not only can he vary the design of the building to meet the function proposed for that unit, but he can give his attention to the design of space between buildings quite as much as to the design of the buildings themselves. This open plan for the arrangement of building units certainly provides for flexibility and a sense of space.

The campus type of school design gives the creative architect an opportunity to bring into play all elements of the situation—plots of grass, trees, shrubbery and varied types of buildings and building materials. If properly done, the effect is most pleasing. It can also reduce building costs. For example, the construction of certain types of buildings is necessarily more expensive than others. Shops, storage spaces and playrooms can be built for less than most of the other units.

The conventional "standard" classroom of the last quarter of a century has not met the needs of the modern teacher. Social science classrooms of today, for example, have become laboratories with areas for small and large groups to work and confer, and with suitable space for exhibits and library materials, cabinets for storage, enclosed work area with running water and sink and provisions for audio-visual learning. Other subjects or units of work have their special demands and the classroom must reflect these needs. Varying requirements are met without too much difficulty when the plant is spread out. The controlling factor, very largely, is the need of the program to be carried out and not the space that can be spared or used with reference to other parts of the school curriculum.

The classrooms in campus plan schools can become creations of teachers and students, parents and school officials, representing a dream for *space, air* and *sunlight,* a place where effective work can be done with efficiency and pleasure. Whether in social sciences, the natural sciences, the languages or mathematics, students and teachers are made to feel that their work is important. The plan of the building in the entire setting; the design both of the building and the rooms within it reflect the importance of the work being done there.

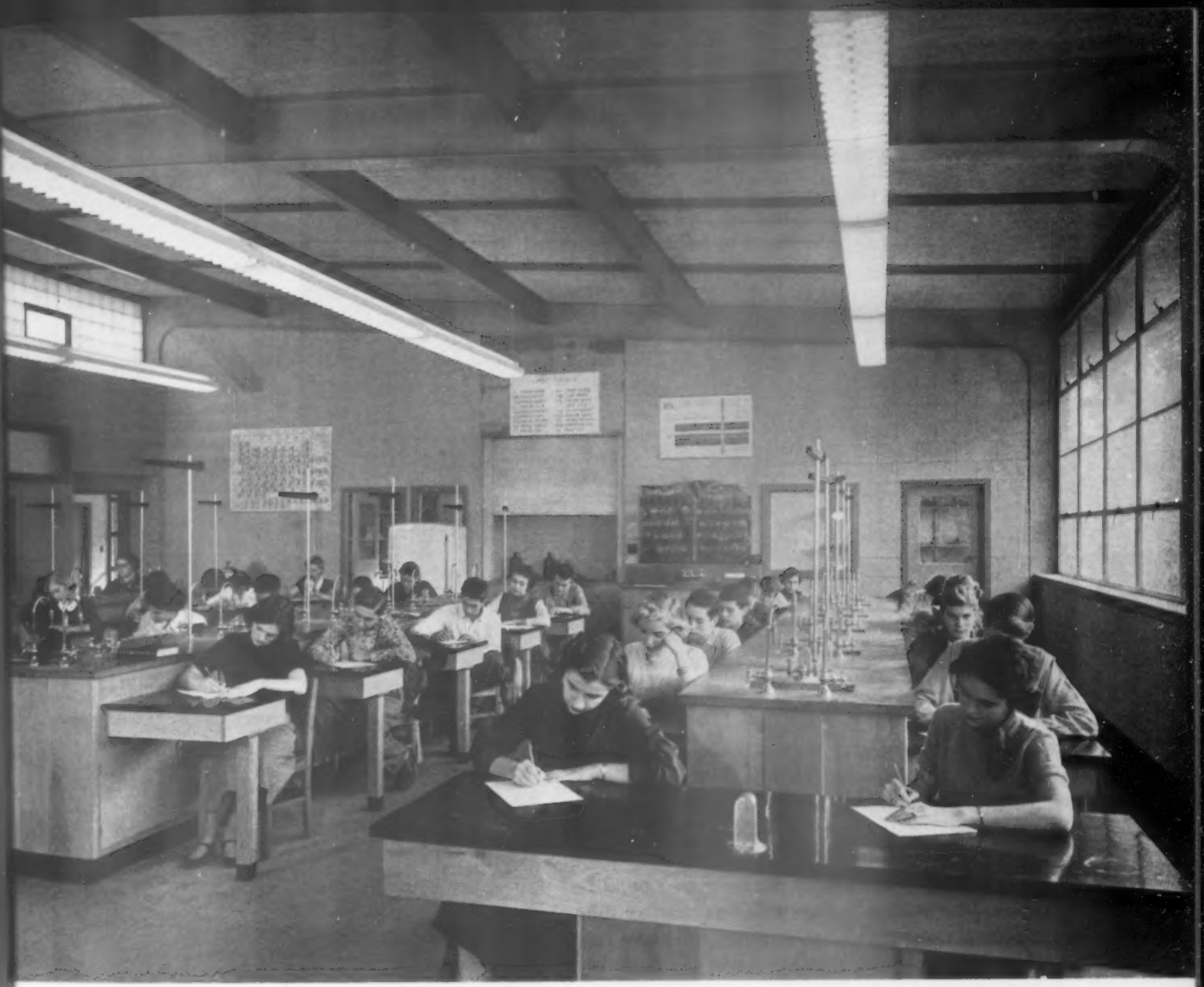
The fireplace in the student lounge of the Myers Park High School is a popular nook.



Students Are Enthusiastic

The students at the Myers Park High School have been asked repeatedly by visitors whether or not they like their school, and almost invariably the students reply with enthusiasm, telling the visitor that they like their school and that it gives them the kind of freedom and absence of restraint from solid walls that they like. One visitor upon interrogating a number of students observed, "Something is stirring at Myers Park. It's evident in the attitude of the students, more readily with some than with others."

The Student Center expresses a concern on the part of the faculty and the community about the children, themselves, as people and as individuals. The planners of this school think that it is important for students to have a chance to relax and mingle with



The chemistry laboratory has combination worktables and desks. The three doors at the opposite end open into small research rooms used by the students.

Double doors open to the outdoors from the browsing section of the library. Removable benches are placed in the open court for use by students.





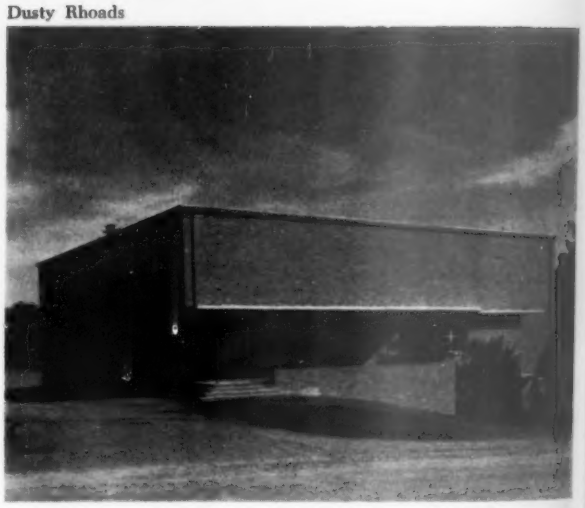
The extensive campus at Myers Park is suitable for many outdoor classes. Art classes, in particular, profit from the surroundings.

other students between classes. They feel that student officers are important and have provided a place for them. The Student Center itself is dominant in the composition of the overall plan. It is not relegated to some secluded or dark place in a building, but occupies almost the entire Student Center Building.

In the Myers Park School the individual pupil is important. The student lounge with its attractive fireplace and its open terraces provides an attractive setting for social activities of many sorts. On Saturday evenings groups of pupils like to assemble there to play records or dance. Parents and members of the faculty are nearby to lend official supervision to a most enjoyable occasion.

A visitor from another part of the country once said: "I have been taking a lot of pictures of the Student Center at Myers Park. In my experience it is hard to get a school board member, let alone the average layman, to appreciate the importance of non-teaching spaces. I don't think I would ever convince my people of its value until they see it personally. Things like a lounge, the milk bar, terraces and walls there have real educational significance."

Dusty Rhoads



The gymnasium building is adapted to the land contours. The stadium and athletic fields are immediately adjacent to the physical education unit.

SCHENECTADY, NEW YORK, PLANS A NEW HIGH SCHOOL



by HARVEY HANDEL

Apprentice in Leadership, Public Schools, Schenectady, New York

Mr. Handel has a B.S. degree from Oswego State Teachers College and an M.A. from Teachers College, Columbia University. He has taught industrial arts, coordinated industrial cooperative programs, was a guidance counselor and a vocational school principal. Mr. Handel has also completed 38 months of duty with the U. S. Navy.



and ROBERT W. BOENIG

Assistant Principal, Riverside School, Schenectady, New York

Mr. Boenig has a B.S. degree from Long Island University and an M.A. from Teachers College, Columbia University. He has held a wide range of teaching and administrative positions in both rural and urban areas and in schools ranging from elementary through college.

THE Schenectady, New York, School System consists of two senior high schools, two junior high schools, three combination elementary-junior high schools and seventeen elementary schools. After the last war, a large deferred maintenance program was undertaken. By now, most of the schools have been given a "package treatment"—new lighting, wiring, painting, roofs and many other extensive repairs that were necessary.

Schenectady's first high school was built in 1903. A second building, connected to the first by a bridge, was added in 1911. The original building was inadequate when built, if measured by present-day educational and community standards. In 1931 a new modern high school was built in another section of the city.

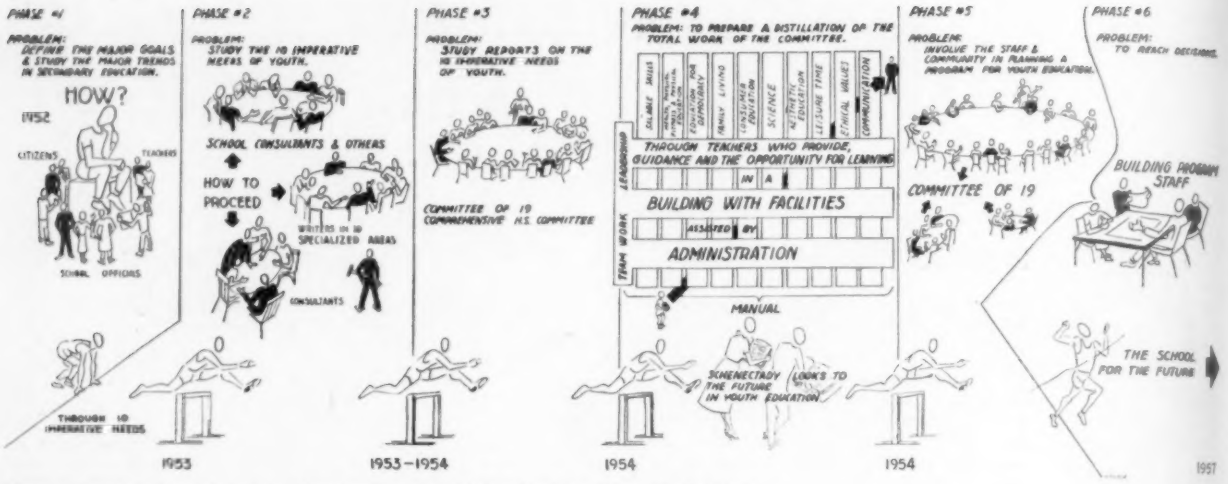
In 1931 the Board of Education had begun to plan the replacement of the original high school. Depression and the war years prevented accomplishment of this goal. In 1944 specific plans were developed to replace the building on its present site, but controversy over a proper site for the building caused delay. In the meantime, increases in the elementary school enrollment made it necessary to allocate available funds for the construction of elementary school buildings.

In 1948 the Board of Education requested the purchase of a 37-acre parcel of land for a new secondary school. This tract is located in the geographical center of the city area now served mainly by the high school to be replaced. The school system, at this time, was fiscally dependent and the purchase was made by the city. The Schenectady schools became fiscally independent on July 1, 1951, by act of the Legislature. Thereafter, all funds for new buildings must be approved by the voters.

In 1952 the community turned down a proposal to increase the school tax limit and to build one new elementary school, plus additions to two others. The issues in this proposal stirred community interest in school affairs. A group of citizens banded together to form a citizens' committee for the public schools. This



The first phase of planning the new Schenectady High School consumed approximately one year, during which a series of meetings were held.



There were six major phases in planning the new high school for Schenectady, New York. Each phase was identified with its own problem, the ways it was solved and by whom.

group, dedicated to the support of the schools, determined that the one most apparent need was a new high school. They stimulated wide interest in the plans for a new high school, and later waged a campaign which was successfully concluded at the referendum held in June, 1954.

The actual planning for the new high school began in 1952. Let's take a look at the entire process.

The Planning Phase Begins

The superintendent's cabinet proposed that a group of citizens, teachers and members of the administrative staff be invited to serve as a planning group to accomplish the following objectives:

1. Publicize the need for planning a new high school.
2. Survey the major goals and trends in secondary education.
3. Organize a committee for effective work in planning a new comprehensive high school.
4. Define the responsibility of the planning committee.
5. Prepare to discuss any issues that might be raised.

It was decided that an educational consultant should be employed to assist in this work. The consultant was to be a person with a rich background in education and one thoroughly familiar with schools. The first job of the consultant was to assist the planning group to understand the trends in secondary education and to aid in determining proper goals for secondary education in Schenectady.

The planning group, working under the leadership of the assistant superintendent of schools for program, decided they would have two committees—one to study the trends in secondary education, the other to select the goals most applicable to secondary schools in Schenectady. These groups immediately took up the task of studying educational literature for current professional thinking on these subjects.

A series of evening meetings were held, at which reports were made to the planning group on any significant contributions found in the professional literature. Discussions took place and attempts were made to prepare a list of educational goals. However, it was at last apparent to the planning group that the members of the committee on goals were willing to accept the statements of "The Ten Imperative Needs of Youth," prepared in 1944 and revised in 1951 by the National Association of Secondary School Principals. Consequently, these ten statements were accepted as the goals for secondary education in Schenectady.

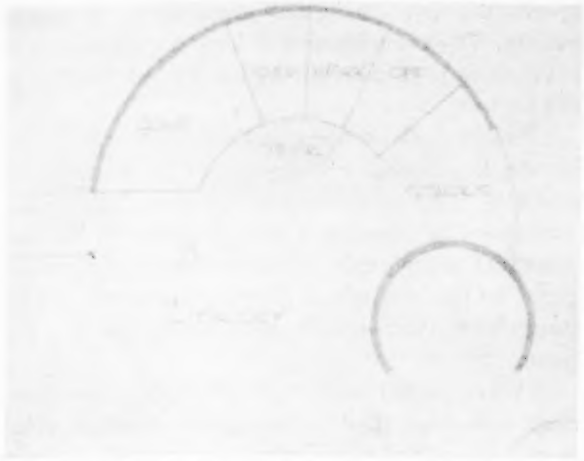
This phase of the planning procedure consumed approximately one year. By this time enrollments in the elementary schools required that the Board of Education give priority to elementary school construction. Planning for a new high school was temporarily set aside.

Renewing the High School Plans

In February, 1953, the superintendent again called the cabinet together to discuss the renewal of planning for a new high school. A number of critical decisions were made:

1. The initial phases of planning were to be delegated to a small group whose members would be the superintendent, the assistant superintendent, an administrative assistant, the director of research and approximately a dozen teachers, principals and supervisors who had demonstrated special ability in previous study and planning. This group was to become the comprehensive high school planning committee.

2. Several members were requested to make thorough studies of educational literature and to prepare written statements on educational goals, as set forth in the report on the imperative needs of youth. These



This portion of the preliminary plan for the new high school shows the circular unit which houses the library and its auxiliary rooms.

writers were challenged to draw out what they considered were important implications for secondary education in Schenectady. They were to think creatively and attempt to picture the high school of the year 2000.

3. Members of the comprehensive high school planning committee who were doing research and writing were granted two weeks of relief from their regular school tasks, if they desired.

4. Regular meetings of the planning committee were to be held during school hours for full-day sessions, and would not be conducted in any of the school buildings. Substitute teachers were to be supplied for teacher members of the group.

5. The educational consultant would work with the planning committee. Because this project exemplified many recommendations of the Cooperative Program in Educational Administration, the director of the Atlantic region of CPEA also was invited to be a consultant.

6. Representatives from the architectural firms who would be planning the new high school were to sit with the committee from time to time to gain impressions from the reports and discussions, and to make any contributions to the group.

7. Although it was recognized that the public at large, teachers in the schools and pupils were not being included in this initial planning, it was agreed that they would be at a later date.

It was planned to have all reports completed and ready for discussion before the close of the school year in 1953. The writers were unable to complete their research, write the reports and carry on their regular school duties according to the original schedule. Therefore, it was necessary to extend the time for completion of reports to the fall of 1953. By the time the research papers were revised and then summarized, we found that the school year 1953–54 had almost come to a close.

During the year the planning committee of nineteen writers and consultants had met at three week intervals. Each writer had been challenged to summarize his own report by listing the important concepts discovered, and by drawing out the implications which he felt applied to the reorganization of secondary education in Schenectady.

Discussion Manual Is Prepared

It was time to take stock again. Decisions had to be reached concerning the course ahead. How were we to present the results of the work of the committee to the citizens of Schenectady? How were we to involve the rest of the school staff so that they would feel they were a part of the planning process? How were we to secure the help of high school students? The original reports were too voluminous. Some of the implications which had been drawn seemed too visionary to place before the staff and the public without careful preparation.

The best procedure, it was felt, would be to prepare a discussion manual from the original reports and



The preliminary plans for the Schenectady High School were prepared by Ryder and Link, architects of Schenectady, and Perkins and Will, architects-engineers of Chicago. The classroom units include 27-foot by 28-foot classrooms which flank an area of resource classrooms and courts.

to use this manual as a means of directing and drawing out the thinking of committee members, to be appointed at a later date. The job of preparing the manual was a difficult one. It was decided to call for volunteers who would be given time to do the writing.

Two members of the group volunteered for this service and were sent to Teachers College, Columbia University, to spend a week with the committee consultants in outlining and planning the approach for writing the manual. After another week of continuous work the manual was complete, had been mimeographed and was submitted to the committee for approval.

On June 8, 1954 the referendum making possible the issuance of bonds for the construction of a new high school was won. The election victory stimulated the planning committee like an electric shock. It now became necessary to work more closely with the architects in determining space needs as a part of the initial planning of the school.

Committees of citizens, students and teachers were formed to determine space requirements for various kinds of teaching areas in the new building. The chairmen of these committees were members of the planning committee. These people met many times, alone and with the architects, during the month of July to determine the specific space requirements that should make up a modern high school.

New Building, New Program

At this writing, the architects are meeting with the various committees. Their function is to create a design for the building which will house the type of program being presented. Mostly, they are listening but when they can see duplications, excessive space demands, impractical structural plans, or money-saving short cuts, they bring this information to the attention of the individual committees.

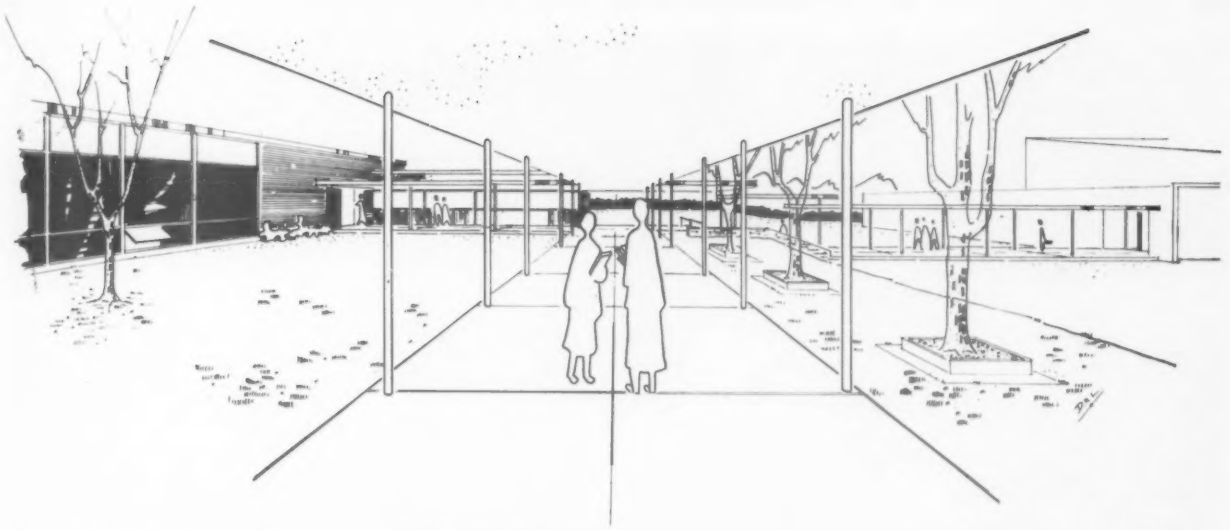
The architects have been challenged to produce specific drawings for the new school during the next six months. The committees will have an opportunity to study these plans carefully before the specifications go out for bids.

While plans for the school are being prepared and construction begins, a workshop will be conducted for members of the secondary school staff so that they may participate in planning a new program for the high schools of Schenectady. The materials which were prepared by the high school planning committee will become the discussion guide for planning the new program.

When viewed in retrospect, the total process shows itself to be more than just planning a new high school. It was discovered that professional research of a very high caliber could be accomplished by selected members of the staff while continuing with their regular school assignments. A number of members of the committee were spurred on to continue their graduate studies. The consultants to the committee were sources of inspiration and assistance. Considerable professional growth was experienced by members of the staff. Much was learned about the democratic processes of working together as a team; new ways were discovered to resolve differences to the satisfaction of all concerned; and a newer, finer relationship was established between the citizens of the community and the school system.

Members of the community, school staff and professional consultants came to an agreement regarding a statement of trends and goals for the youth of Schenectady. A staff committee did research to discover the best in thinking, procedures and practices pertaining to these goals. The findings of this committee were made available in a manual, and a source book. The school became a community project because citizens, teachers and students participated. The architects worked in close cooperation with citizens and staff in the planning of the school. The concomitant values of the planning process have proved to be of exceptional worth.





A covered walk leads from the gymnasium building to the arts and crafts unit of the Junior-Senior High School for Greenburgh, New York. Warren H. Ashley, architect.

ADVANTAGES OF THE UNIT PLAN FOR SECONDARY SCHOOLS



by WARREN H. ASHLEY

Architect, AIA, West Hartford, Connecticut

Warren H. Ashley received his Bachelor of Architecture degree from Syracuse University. He has designed over 30 school projects since World War II and was the first architect in New England to design public schools, both elementary and secondary, on the unit or campus plan.

A LOCAL school building committee is faced with the necessity of providing the community with a school plant that will supply satisfactory answers to all demands made upon it in the present, in the foreseeable future and, as much as possible, in the unforeseeable future. If the community is a normal one, the committee is expected to provide this ideal school plant on a very limited budget.

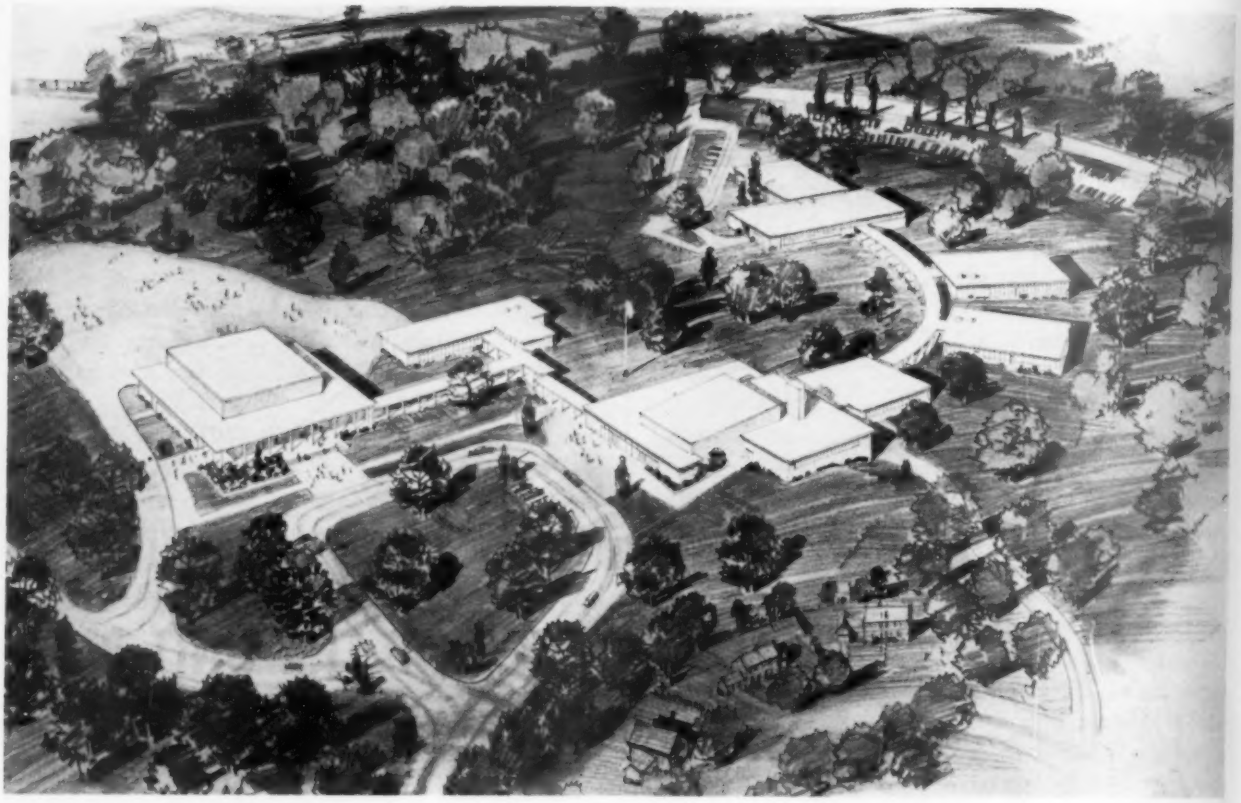
Just as the local educational program must have the flexibility to meet changing local needs, to cope with changing emphasis in subject matter and to handle new techniques in teaching, so the school plant must have the flexibility to meet these changes in the educational program. Equally important, it must be able to meet any fluctuating space requirements caused by an increased birthrate, a new residential development or an industry moving into or out of an area.

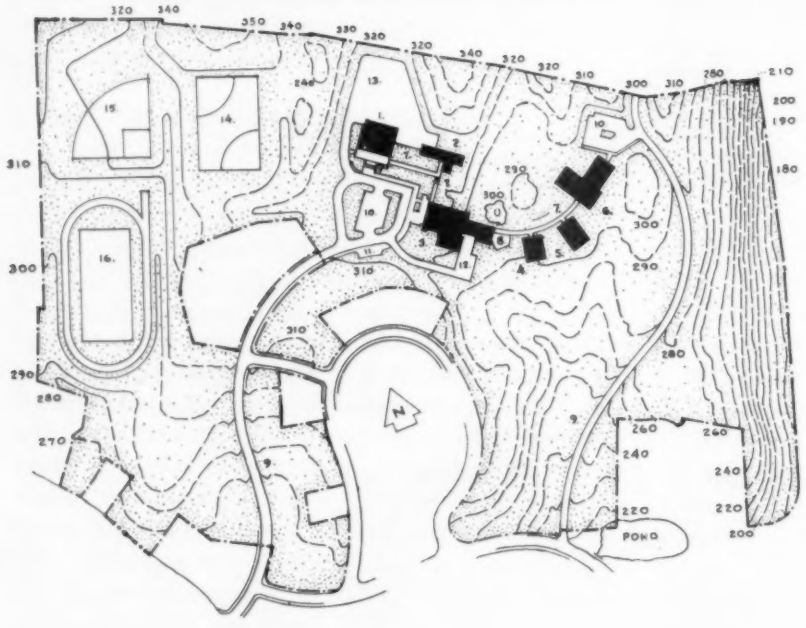
Educators and educational consultants, interested in enriching the school experience for pupils and concerned with broadening the base of school activities to include the community as a whole, have recognized that the entire school site is potential educational space.

The conscientious school architect is aware of his responsibilities as a member of the planning team. The present wave of different solutions to individual school building problems—unit plans, cluster plans, finger plans, zoned, core, etc.—is a healthy sign that school planners are constantly striving for the greatest possible economy in designs based on fundamental educational concepts. Every penny of square foot cost is important, and every square foot is important in the total cost. Every foot of the building and grounds not actually used for educational purposes is suspect.

Campus Concept Is Not New

The concept of a campus is by no means new. Colleges and private preparatory schools for many years have had groups of separate buildings arranged in more or less orderly fashion on more or less attractively landscaped grounds, with athletic and play fields.



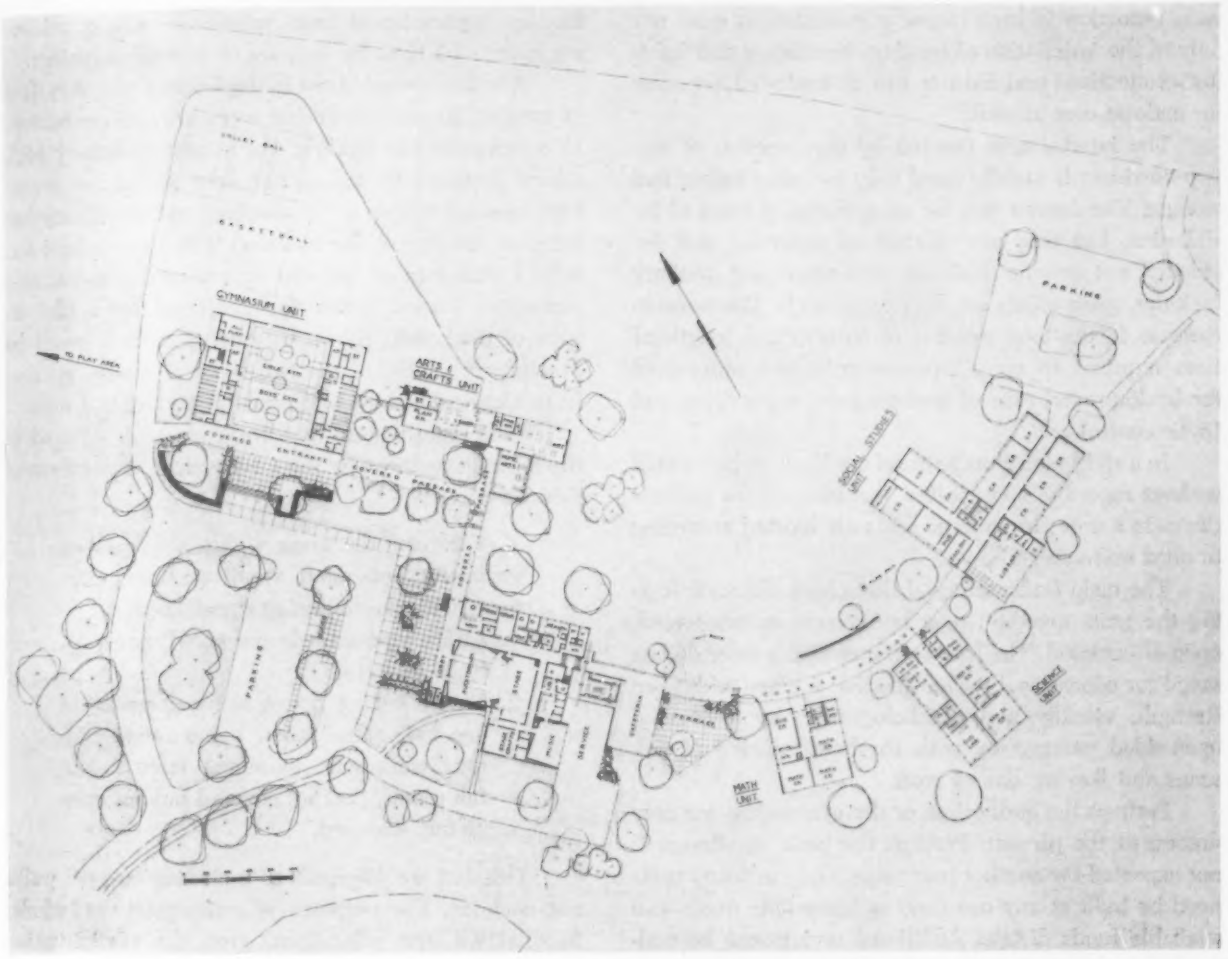


The Edgemont Junior-Senior High School in Greenburgh, New York, consists of six main building units. They are identified on the site plan at left as:

1. **Gymnasium and locker rooms**
2. **Arts and shop unit**
3. **Administration, auditorium and cafeteria**
4. **Business and mathematics unit**
5. **Science unit**
6. **Library, social studies and language unit**

The need for adequate playgrounds has long been recognized. Accessibility is considered important. More recently, the possibilities of immediately accessible outdoor classrooms have been recognized as having a real place in the educational program. Experimental gardens for biology students, herb and flower gardens and outdoor dining for home arts groups, outdoor painting and drawing for art students and outdoor work areas for the shops are practical, even in New England. And outdoor classrooms are obviously the most economic educational space.

A student summer sports program will demand shutting off the rest of the school. Attendance of the community at school events, such as basketball games and dramatic presentations, requires shut-offs. Separation is the simplest way to accomplish this. A vital adult education program requires opening up, separately or all at once, the home arts, arts and crafts, shops, science



Building plans of the Edgemont Junior-Senior High School. All units are connected by a continuous covered passage leading to the corridor of each unit.

rooms and perhaps the gym. This means heating and lighting these areas while other sections are closed. It also means accessibility to parking areas and drives.

There is nothing new about isolating shop areas. They are noisy. So are gymnasiums and locker rooms, cafeterias, corridors, music areas and typing and business machine rooms. So, at times, are the arts and crafts and stagecraft areas and some outdoor activities, Means must be found to protect quiet areas. Isolation is a lot less expensive than elaborate acoustical treatment. Isolation is also the most efficient fire barrier.

Each classroom, to realize its full potential, must be oriented according to its function. Social rooms, gymnasiums and locker rooms, libraries and biology rooms need sun. Art rooms, chemistry and physics labs, industrial shops and health rooms need north light. Yet, these rooms must be located to serve the program. Why not, then, pull apart the components, group them according to the program and orient them according to their functions?

Provision for expansion with a minimum loss or rearrangement of existing facilities must also be taken into consideration. Mechanical connections to utilities in additions are expensive enough to install during construction, but are even more so at a later date. Breaking out walls, even temporary ones, is costly.

Why not let expansion of facilities be by independent and self-contained units? There will be no disruption of existing facilities, and the new ones may be properly located and oriented without throwing out of gear inter-relationships of existing educational areas.

Examining a Conventional Plan

There are circumstances, of course, when a multi-story building is the only practical solution. A conventional type plan may be required when the site is inadequate in size or when a committee insists on a traditional appearance. If the site and the committee allow, however, some areas of the conventional plan demand scrutiny. Corridors, stairs and stair halls required by multi-storied buildings and by single-storied buildings with varied floor levels consume many square feet of area. Stairs and cross traffic create safety hazards, however carefully planned. Why not let the site itself, as much as possible, carry the job of circulation, disperse cross traffic, eliminate stair hazards? Also,

each reduction in area means a reduction in costs not only of the installation of heating, ventilating and lighting connections and fixtures but of custodial expenses for maintenance as well.

The interior area created by the junction of any two corridors is usually good only for gang toilets and storage. The former may be an economical form of installation, but they are difficult to supervise and decidedly not morale builders. By dispersing sanitary facilities, gang toilets are done away with. The possible increase in the total number of fixtures and length of lines required to serve separate units is compensated for by improved ease of maintenance, supervision and traffic control.

In a rigid plan storage areas are likely to be located without regard to accessibility, just because the space is there. In a unit plan storage areas are located according to need and accessibility.

The main traffic artery of the school, the walk linking the units together, may be covered or uncovered, open or enclosed. The less wall or roof, the more dollars saved for educational space. The link is given additional strength, visually and psychologically, by a covered open-sided passageway with rhythmic spacing of columns and flowing line of roof.

Perhaps the auditorium or the gymnasium are only dreams at the present. Perhaps the peak enrollment is not expected for another four years. Only as many units need be built at any one time as immediate needs and available funds dictate. Additional savings can be realized by duplication of units, wherever feasible, achieving room variations by location of interior partitions.

Whether or not there is duplication, the very fact of smaller, more manageable units attracts contractors to compete in the bidding. On a large two-story high school designed by the author, four out of the seventeen interested contractors dropped out specifically because of the size of the building. This same school has a final total area of 140,000 square feet. The building committee turned down the proposed open plan in spite of the results shown by careful analysis based on preliminary studies of the two types of design, starting from identical square foot totals of educational area.

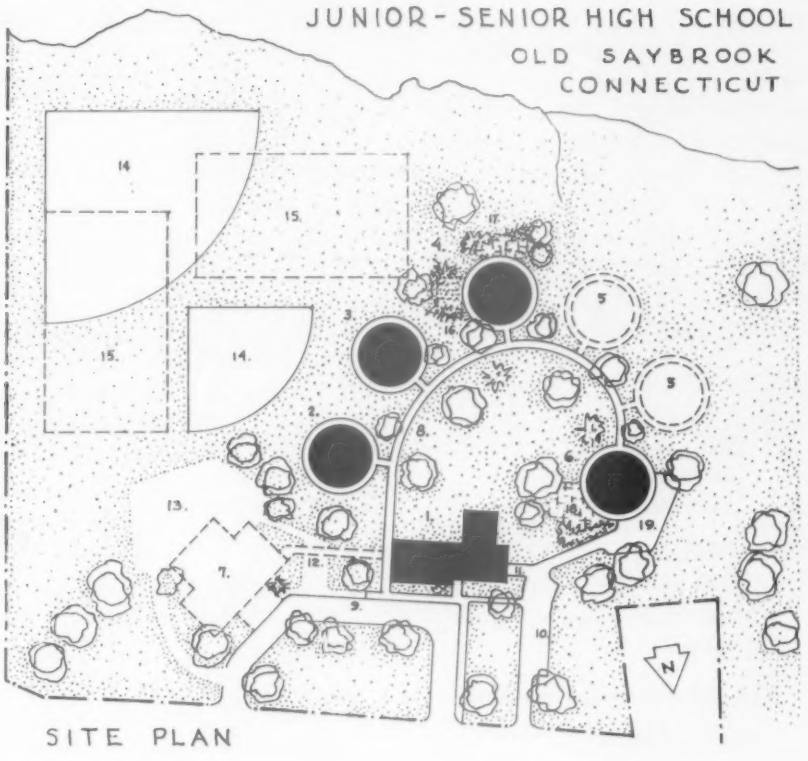
In figuring square foot areas we have adhered to the formula required by the Connecticut Department of Education:

> The sum of the areas within the building perimeter computed at all occupied floor areas with the following stipulations:
> 1. Attics, pipe tunnels and crawl spaces not to be included.
> 2. The following spaces to be computed at one half actual area: boiler room, janitor's workroom, basement store rooms, fan rooms, porches covered but not completely enclosed.

This last we interpret as including covered walks not enclosed. For purposes of comparison we include, in what we term educational area, the administration

Preliminary plan of the Junior-Senior High School for Old Saybrook, Connecticut, Warren H. Ashley, architect. The circular units house classrooms, library, science, homemaking and shop areas. The main building is for administration and the cafeteria.





Site plan for the Junior-Senior High School in Old Saybrook, Connecticut. The dotted lines indicate future buildings and play fields. The spacing of the building units assures full utilization of the site with ample areas remaining for athletic fields.

area, teaching areas, auditorium, music, gymnasium and locker rooms, cafeteria and kitchen. Again, we include locker rooms and kitchen because if a school has no gymnasium, it needs no lockers; if it has no cafeteria, it needs no kitchen. The comparisons are as follows:

Proposed Senior High School
Preliminary Cost Comparisons

	Closed Plan	*Unit Plan*
Educational area	108,820 sq. ft.	108,820 sq. ft.
Circulation, toilets, service, and areas at ½ actual size (see above)	48,630	27,200
Total square feet	157,450 sq. ft.	136,020 sq. ft.
Cost per square foot	$15	$15
Cost of building	$2,361,750	$2,040,300
Site development	200,000	200,000
	2,561,750	2,240,300
Professional fees	153,705	134,418
	2,715,455	2,374,718
Equipment and contingencies	250,000	250,000
Totals	$2,965,455	$2,624,718

The open plan would have saved the community $340,700 that could have been used for more equipment, further development of the site or saved for future expansion.

Groton Senior High School

The plans for the Senior High School, Groton, Connecticut, a unit or campus type school now under construction, are the result of intensive collaborative study by the local board of education, educational consultants, site planner, engineer and architect to produce the best solution to Groton's school problem and at the lowest possible cost.

The program called for breaking up the senior high enrollment into 150-student "neighborhoods," clustered about the "community center." Special rooms are central and accessible for evening use by adults, while regular classrooms form the outlying elements. Classrooms are grouped according to pupil use instead of departmentalized by subject on the theory that this will accommodate any kind of set-up: orthodox classes or a thorough-going "core curriculum"; lone teachers or teacher-teams; or any combination of methods.

The site is on a knoll with a panoramic view of Long Island Sound. Heavily wooded spots form ready-

made classrooms for nature study and an outdoor theater. Units are located to take advantage of comparatively level areas for the sake of economy, while the cafeteria, library and administration areas are oriented to make the most of the beautiful view.

The plant for 595 pupils has a total area of 63,205 square feet. This is again figured in strict accordance with the above formula. The total square feet of area for the educational program, based on final drawings, amounts to 50,444 square feet and includes the following:

Classroom Units	
Classroom Area Unit #1	**5,824 sq. ft.**
Classroom Area Unit #2	**5,696 sq. ft.**
Classroom Area Unit #3	**5,824 sq. ft.**
Classroom Area Unit #4	**6,272 sq. ft.**
Main Building	
Classroom #7 and Art Room	**1,702 sq. ft.**
Music, Auditorium, Cafeteria and Kitchen	**12,203 sq. ft.**
Locker Rooms and Gymnasium	**10,603 sq. ft.**
Administration	**2,320 sq. ft.**
Total Educational Program Area	**50,444 sq. ft.**

Thus the total area in the educational program is 79.8 percent of the total building area.

According to Engelhardt, Engelhardt & Leggett, educational consultants, the above educational area in a good conventional plan would represent 70 percent of the total plant, bringing the total area of a conventional type building of comparable pupil capacity to 72,063 square feet, or 9,038 square feet more than the unit design. This differential with only slight variations appeared in all our preliminary studies of conventional solutions. The square foot cost was $14.12 per square foot. Reducing these figures for simplification to 9,000 square feet at $14 this still represents a saving of $126,000 on building area alone.

The Connecticut Public School Building Commission in its pamphlet, *Connecticut Builds Schools, Volume II*, states that the average secondary school built in Connecticut from August 1950 to December 1952 has 109 square feet of building area per pupil. Again allowing 70 percent of the total area as educational area, this represents a square foot area of educational space of 76.3 per pupil. The efficiency of 79.8 percent achieved by the unit plan means that of the 106 square feet of building per pupil, 84.59 square feet are for educational purposes.

In this same survey the cost per pupil of the average secondary school project was found to be $1,911.40. The cost per pupil of the entire Groton High School project is $1,815.12. Thus the new school plant, while providing more than average educational space, costs almost $100 less per pupil than the average secondary school of that period.

Another Unit Plan

The town of Greenburgh, Westchester County, New York, had 70 acres of rugged, hilly terrain, dotted with woods and large stone outcroppings. To construct a single junior-senior high school building for their projected enrollment of 550 pupils would have required extensive and expensive rock excavation. The building committee wanted the new school plant to provide maximum flexibility for the educational program. Use by the community of the gymnasium, auditorium, cafeteria, library and arts and crafts center must be possible without opening up the entire school. Economical expansion to handle future increases in enrollment must be assured. The building committee decided on the unit plan as being the only practical answer to its requirements and problems. Deployment of facilities makes possible the placing of the resulting units on areas of the site which are level enough to reduce to a minimum costly rock excavation.

Much of the corridor congestion of a rigid plan will be avoided and traffic past teaching areas eliminated. On this beautiful site a walk from one unit to another by the covered passageway will provide a pleasant interlude between classes. Complete flexibility of interior partitions will meet any future needs that may arise through changes in program. Additions to initial units or the addition of new inexpensive units will take care of any increase in enrollment.

Separating Junior and Senior Highs

There seems to be a trend toward separating junior high school activities from senior high school activities. The unit plan makes it possible to use such major facilities as the gymnasium, auditorium, cafeteria, arts and science rooms and administration areas for both groups, while providing the psychological advantages for the twelve to fourteen year olds of feeling that they belong through having some of their own separate facilities and a homeroom atmosphere.

Units can be designed to express their special functions, or designed for economy through duplication. They can be built all at once or only as required. Increased facilities for one particular age group can be provided without throwing out of balance the whole arrangement of the school.

By the simple device of separation the unit plan achieves increased efficiency, safety, control, flexibility and economy. Yet, the designer has greatly increased freedom in giving each room a proper relationship to its neighbors and each part of the school its proper relationship to the site as a whole.

Reynolds Photos



KEOKUK—A SENIOR HIGH SCHOOL, JUNIOR COLLEGE AND COMMUNITY BUILDING



by J. C. WRIGHT

State Superintendent of Public Instruction, Des Moines, Iowa

Since 1928 Mr. Wright has served the public schools of Keokuk, Iowa, as instructor, principal and superintendent of schools. He has also taught classes at Iowa State Teachers College and Northeast Missouri State Teachers College. From 1943 to 1946 Mr. Wright was a lieutenant commander in the U.S. Navy. He has a B.A. degree from Drake University and an M.A. from the University of Iowa.

LIKE all towns right after World War II, Keokuk, Iowa, was long on school children and short on schools. But unlike most of these towns, Keokuk did not build a new elementary school. It built a senior high school instead. These were the sound reasons why:

1. Since Keokuk is bounded on three sides by rivers it had grown north, leaving the old senior high school far from the center of high school population.
2. Converting the old senior high school into a junior high freed the old junior high for transformation into an elementary school in an area where one was needed.
3. Gymnasium and shop space in the old senior high school were inadequate for senior high school pupils, but are quite satisfactory for junior high.
4. Keokuk's educational facilities stopped with high school. The nearest state college was almost 100 miles away.
5. Keokuk badly needed facilities for community activities.

Keokuk Senior High School and Community College was, therefore, designed to serve the citizens of Keokuk from junior high on up.

At the time the bond issue passed, the board had bought a 30-acre tract of land near the edge of town in the direction of Keokuk's greatest residential growth. It had been assured the assistance and advice of Dean E. T. Peterson, Department of Education at the University of Iowa. The board had also selected Perkins & Will, Architects-Engineers of Chicago, to design a building for this site, and had given them free rein to break with traditional design if they felt it advisable. They did.

Six Major Premises

Six premises governed the planning of Keokuk Senior High:

The site would not logically take a spread-out building. The site was small, irregular in shape, with a 50-foot drop from north to south and a ravine knifing through it. Therefore, though the emphasis at the time was strongly on one-story buildings and finger plans, Keokuk Senior High was designed with a four-story



A cantilevered corridor provides protection for an open walk just outside the shop area at the ravine floor level of the Keokuk High School. Perkins and Will, architects-engineers.

high academic unit. This unit bridges the ravine and seems to grow out of the ground. The two-story administrative wing lies on one shoulder of the ravine. The huge field house is dug part way into the slope so that its large bulk is subordinate to the mass of the classroom unit.

Because the site was limited, every square yard had to be used for something. Making use of the unusual contours, landscape architects William A. Dean, William E. Rose and Robert W. Mudra set the football field on the floor of the ravine, using its sides for bleacher seating. Tennis courts and baseball diamonds occupy leveled-off spaces downhill from the school.

Classrooms should be physically separated from other parts of the school. Sources of noise—the field house, cafeteria and music rooms—were purposely isolated to provide classrooms with maximum quiet without restricting school activities that are naturally noisy. The field house and outdoor athletic areas are as far from classrooms as possible. Cafeteria, kitchen and showers are grouped together at one end of the administrative wing, along with the boiler and music rooms. The future shop wing is planned as a completely separate unit. All these noise-producing areas are south of the academic unit and since all classrooms face north, there is little penetration of disturbing noise.

This separation has been carried even into the academic unit itself. Laboratories and home economics rooms—the most interesting classrooms to the public and therefore the most visited—are on the first floor where they are easily viewed. Classes needing quiet are on the upper floors. Although classrooms are open to corridors, acoustical ceilings and the barrier of lockers keep the noise of footsteps in corridors from being a distraction in classrooms.

A glass corridor wall gives light and emphasizes the spaciousness of the corridors in the four-story academic unit of the high school.



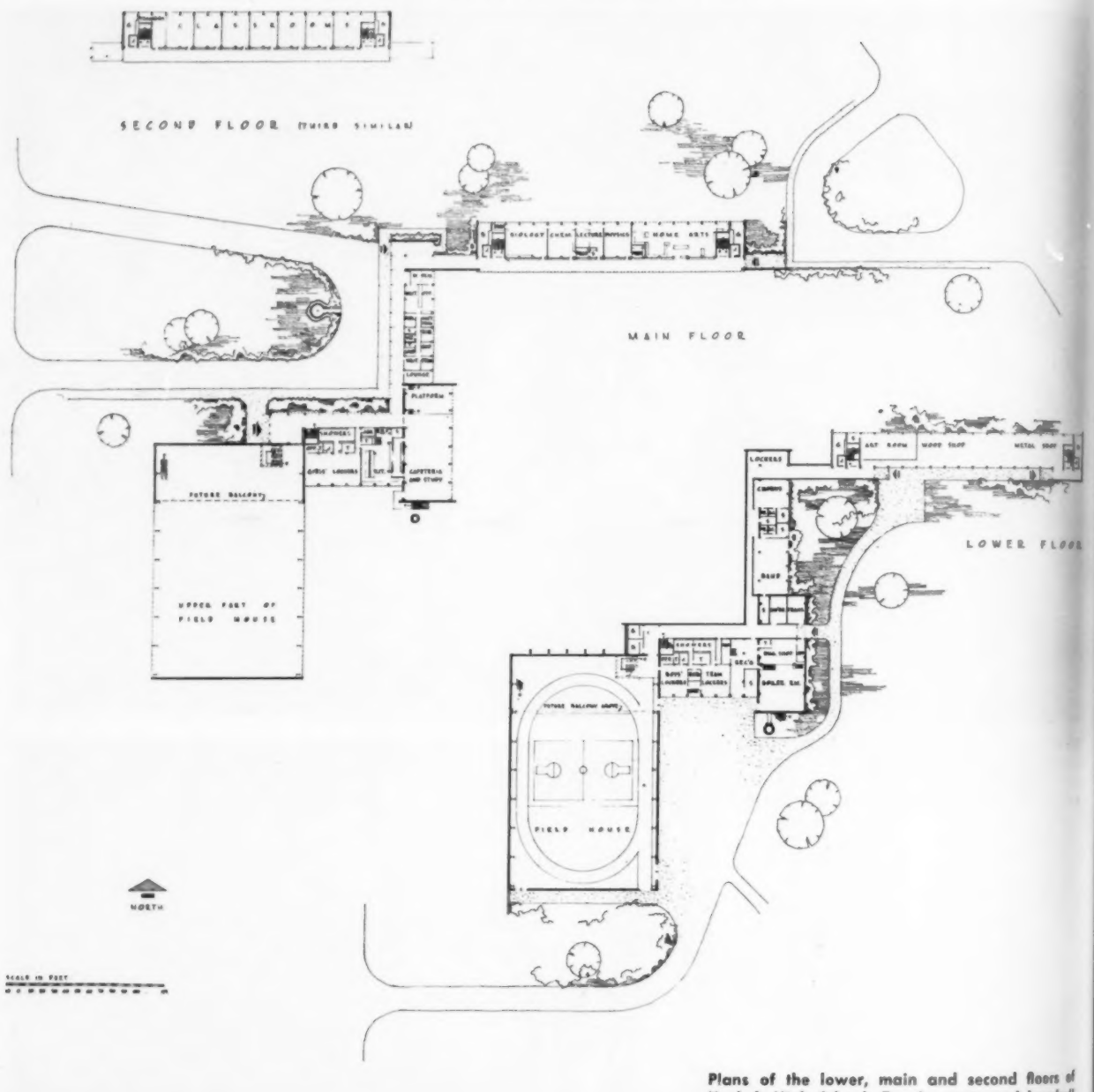
Interstices are fully as important as classrooms. Perkins & Will have long felt that any architect can design a classroom, and that other areas were just as important in satisfying the needs of high school youth. In secondary schools the classroom is a place of concentration, and does its job if physical conditions permit



The biology laboratory of the high school occupies three bays. Counter space lines two walls. The room can be used for lectures and discussion periods in addition to table work.



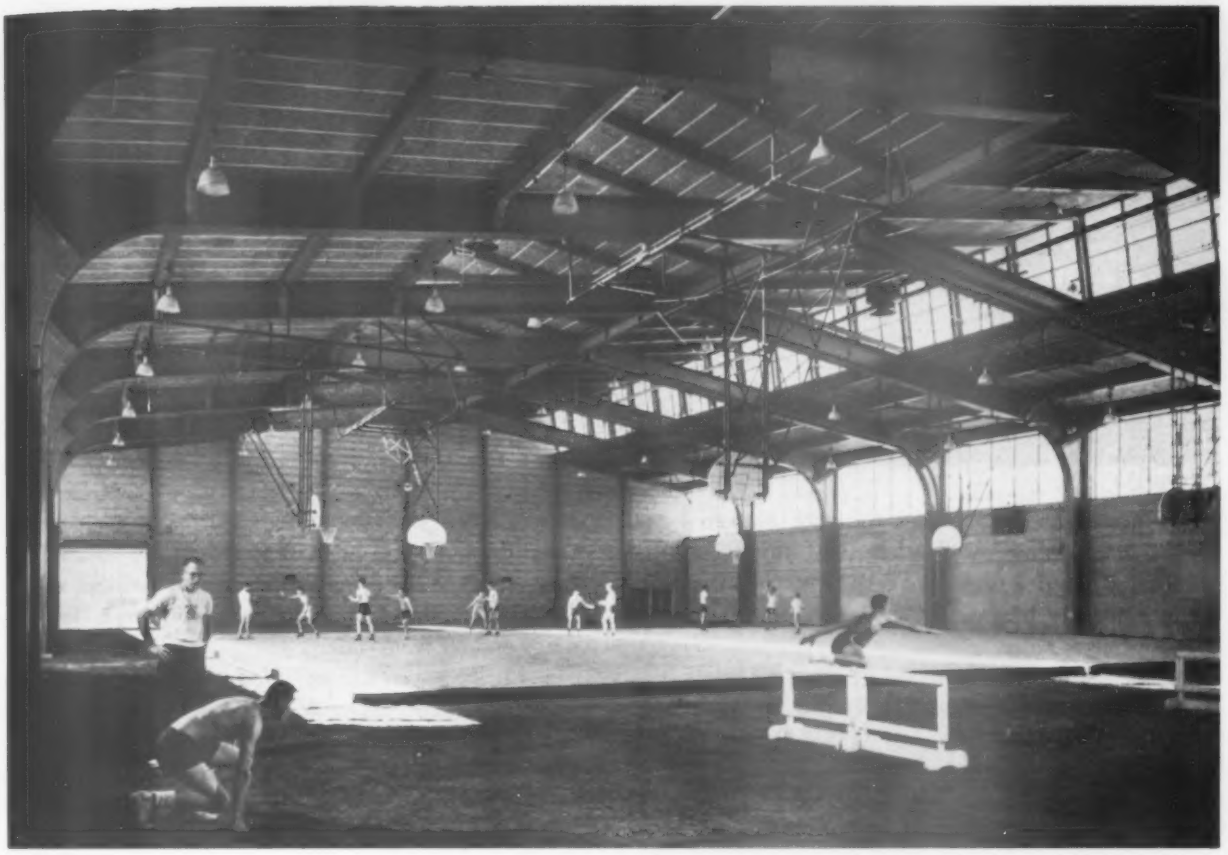
Corridors are cantilevered toward the south from the steel and concrete frame of the academic unit of the building. Lockers line the inner wall with open space above for classroom ventilation. Between classes the students use the corridors as relaxation areas.



Plans of the lower, main and second floors of Keokuk High School. Tennis courts and baseball diamonds occupy leveled-off areas downhill from the school.



In the dressmaking section each girl has a drawer for her work. These drawers fit into slides under the work tables or are stored in cabinets at the rear of the area. North windows provide daylight, supplemented by bilateral light from the south corridors.



When completed, the Keokuk High School field house will seat 3,000 spectators on bleachers which can be folded into the wall when not in use. A girls' gymnasium is located in the balcony.



This section of the home-making area is for cooking and serving. Three separate counters allow activity without confusion when classes are large.



Until the proposed library is built, the cafeteria is a multi-purpose room. It is a study hall during most of the day and becomes an auditorium on special occasions. The library stacks are on casters and can be moved against the wall when more floor space is needed for other purposes.

that concentration. At Keokuk they do. The glass wall on the north provides glareless light throughout the school day. Single-loaded glassed corridors on the south let in balancing bilateral light. Acoustical tile on ceilings minimizes noise.

Corridors Are Bright

In comparison to the well lighted classrooms, corridors are bright and purposely so. Like the bright light that attracts moths, these corridors give students the psychological pickup they need between classes. After the tensions of a class, here is a change of view, a change of air and a stimulating change in atmosphere. While there is a small lounge at ground level, students prefer to relax in the sunny corridors, leaning against the railings and chatting or discussing school problems or exchanging banter. Like the "coffee breaks" that have proved of value to workers, these "corridor breaks" have the same recharging effect on Keokuk's students.

The building must also serve as a center of community activity. Keokuk, with 20,000 people, needed a place that could handle large community functions such as banquets, concerts, automobile and boat shows, plays and other large assemblages of people and things. The Senior High School fulfills that need. The multi-purpose room, for example, will seat 500 as an auditorium or 300 as a cafeteria. The kitchen can feed 300 in the cafeteria or 1,000 in the field house with equal ease. A large dumbwaiter brings supplies from ground level to the kitchen and takes hot food from kitchen to field house. An overhead-type door at one end of the field house is big enough to let in vehicles of almost any size, so that almost any manufactured product can be displayed there.

Keokuk Community College will be in full operation this year. When it is, high school graduates will be able to take courses in business, the trades, liberal arts and pre-professional studies. Keokuk will qualify as an accredited Community College, its graduates acceptable as juniors in most four-year colleges. At any time, too, the shops and other school facilities will be available to the community for their use in the evenings and on weekends.

Facilities can be expanded when needed. Because the bids which Perkins & Will received on their original design came in shortly after the start of the Korean War, we had to cut expenses sharply. Rather than cut quality we trimmed both space and equipment. We had already abandoned hope for a separate auditorium before final plans were drawn. In the paring, we also gave up temporarily a separate library, the shop building and a separate gymnasium area for girls. The library now shares space with the cafeteria and auditorium, and the woodworking and metalworking shops are at minus one level of the academic wing. Both girls and boys are using the field house for physical education.

The future library will probably be at ground level opening off the entrance foyer, thus balancing architecturally the cafeteria at the opposite end of the administrative wing. The shop wing, originally planned as a separate unit on the east shoulder of the ravine, may instead be located at minus one level, an extension southward of the existing shop space. A balcony in the field house will give the girls their own physical education area directly outside their lockers.

There Are Enough Classrooms

For the near future we have enough classrooms. When more are needed, they will be in another multi-story unit north of the present one and connected to it by glassed corridors. Keokuk at present has classrooms for 850 students, about twice the 1953–54 enrollment.

Cost. At a total cost of $1,275,000, or about $13.61 per square foot, we feel we got our money's worth and have a building of which we are proud. Keokuk's citizens, who make full use of the building, think so too.



Interior of a general education laboratory in the Learning Unit of the Senior High School in Groton, Connecticut. Warren H. Ashley is the architect.

A UNIT HIGH SCHOOL FOR GROTON, CONNECTICUT



by ELAINE ROGERS

Equipment Design Consultant, Office of Warren H. Ashley, Architect, West Hartford, Connecticut

Miss Rogers, a graduate of the Sacker School of Design in Boston, received her educational training at the Boston University School of Education. She was an apprentice teacher at the Beaver Country Day School in Massachusetts and taught arts and crafts at the Boston Y.W.C.A. workshops. Miss Rogers has also studied at the Columbia University School of Architecture.

THE district to be served by the new Senior High School for Groton, Connecticut, is spread out along the shore of Long Island Sound between two navigable rivers. A little over one half of the entire property valuation is owned by the Federal Government. The United States Naval Submarine Base and the U.S. Coast Guard Training Station are totally tax exempt, as is a substantial proportion of the buildings and equipment of the Electric Boat Company, makers of the much publicized atomic-powered submarines.

The remainder of the school district consists of the old New England village, some fishing, some small business, one large taxpaying industry and colonies of summer cottages. Children of summer residents, of course, do not have to be educated in the local schools, nor do municipal services have to be supplied, except in summer. On the other hand, the town does have to supply educational facilities for the children who live at the submarine base and those who live in the Federal housing projects. There are at present over 2,000 of these housing units and, as this is being written, another 450 are under construction. One-third of all these units are completely tax exempt and payments, made on the others by the Government in lieu of taxes, fall slightly short of covering the cost of municipal services to these families.

The Federal Government also pays the town on a school attendance basis for children from the naval base and for those whose families are employed by the Electric Boat Company and live in Federal housing projects. A large proportion of these families consist of young people and, since they reflect the nationwide increase in the birthrate, there has recently been a tremendously increased elementary school enrollment.

Over 100 elementary classrooms have been added to the school system in the last two years, and the junior high grades are about to take over the existing high school. A new senior high school has been needed desperately but, in spite of Federal and State aid, the cost had to be rock bottom.

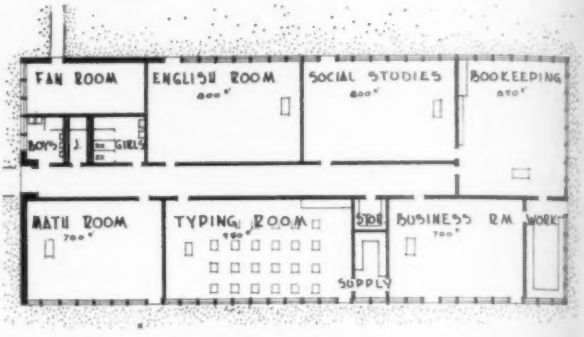
In Favor of an Auditorium

The members of the Board of Education, which in this case served as the building committee, had resigned themselves to making the auditorium in the present high school building serve both the junior and senior high programs. Since the only gymnasium in town was on the stage of that auditorium, programming would be very complicated. The educational value for the new school in being able to use the auditorium in close conjunction with the rest of the school program and with music, art, shop and drama study would be lost.

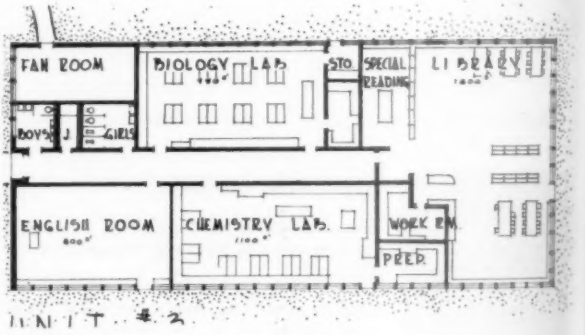
Music in Groton is an interest of long standing. Instrumental instruction is started in the seventh grade and interest in the activities of the band is so lively that there is even a Band Boosters' Club. To have this lively group and no auditorium seemed definitely wrong. Because of the limitations of the existing gymnasium a new one was considered essential but it would have to be the minimum size still eligible for state aid.

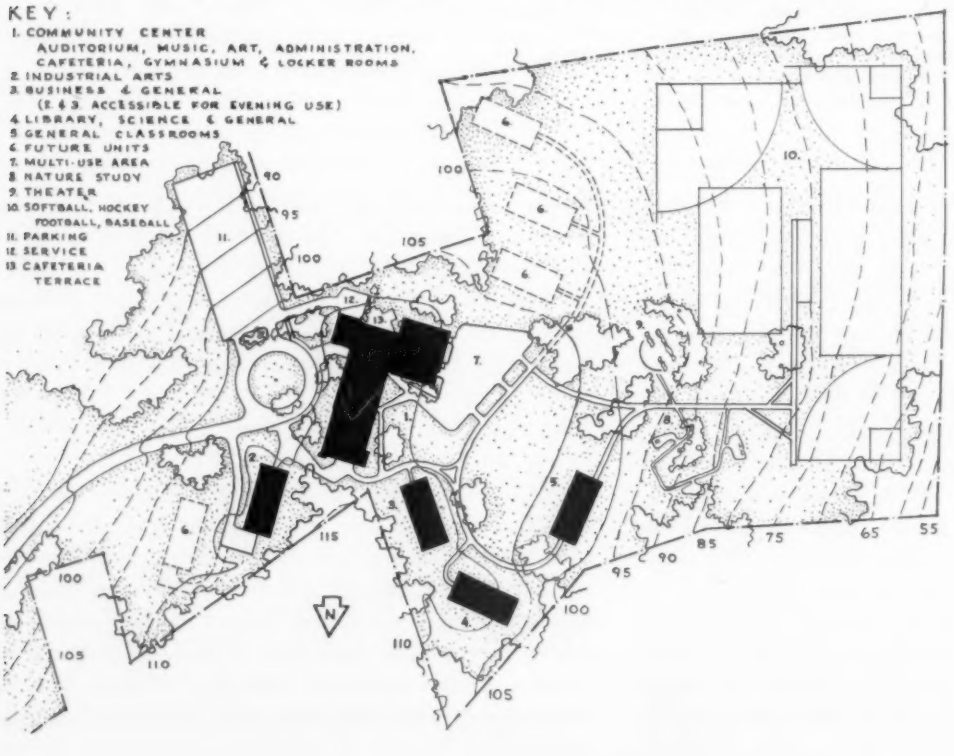
Selecting the Site

Warren H. Ashley of West Hartford, Connecticut, who had been selected as the architect, was consulted in the selection of a site. He, with the land planner, Charles A. Currier also of West Hartford and the educational consultant, Nickolas Engelhardt, Jr. of Engelhardt, Engelhardt and Leggett of New York, made a thorough study of the several sites under consideration. They advised the board to acquire a 65-acre site on a knoll overlooking Long Island Sound. Besides having a magnificent view, the potential educational values



The Business Unit of the Groton High School has six classrooms. The Library Unit, below, also contains two science laboratories and an English room.





The irregularities of the site are evident in this plan. Common facilities are located in the Community Center Unit. These include the auditorium, music, art, administration, cafeteria, gymnasium and locker rooms.

of the site were quite obvious. Wooded areas would provide outdoor classrooms for studying nature at first hand. To create an outdoor theater on the natural slope would cost very little in either effort or money. Grading for athletic fields would cost more than on a level site, but the educational values to be gained would compensate for that.

The idea of designing a public school in New England on the unit plan was entirely new when preliminary drawings were started. The plan developed by the architect, working closely with the land planner, showed separate units grouped at the narrow waist of the site. This would allow the location of athletic fields on the broader end of the property, on terrain less steeply sloped and nearest on foot to the large housing project just down the hill.

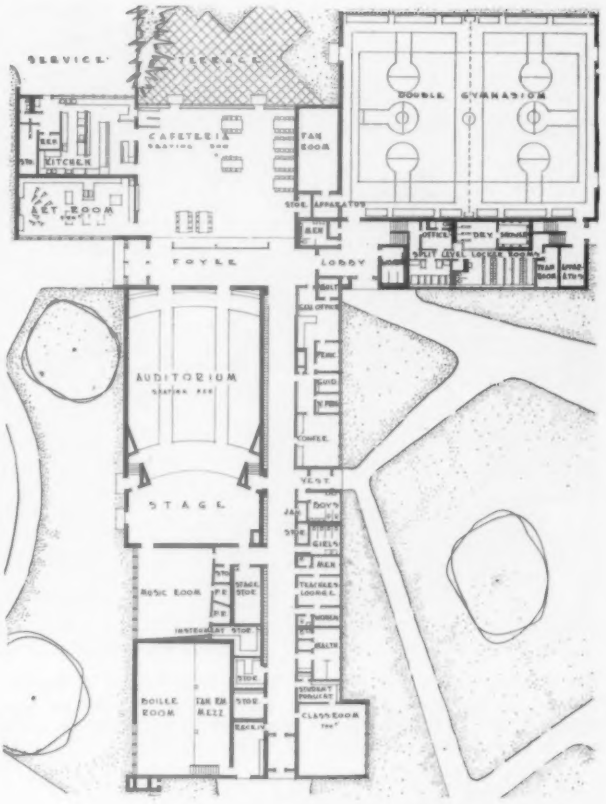
The four units of the Groton High School plan are identical in exterior dimensions, construction and service area, which realized a substantial savings by repetition. The only differences are in the arrangements of the classrooms, and these partitions can be changed to suit the program. Locating the units to take advantage of the comparatively level portions of the site eliminated any stairs and changes of floor level within the units and simplified footings and foundation work appreciably.

When the preliminary estimates came in, it was apparent that the savings achieved by this plan for the academic classrooms made possible the inclusion in the project, not only of a tournament-size gymnasium, but of an auditorium for 525 with sloping floor and acoustically treated ceiling. The music room and instrument storage adjoin the stage and the arts and crafts room is just across the foyer.

The cafeteria, with its terrace and view, seats 300 at one time. It also doubles as a student lounge and as a social room serving either the auditorium or the gymnasium programs during intermissions, when the main building is open for evening functions.

Evening Use by Adults

Evening classes for adults are in demand by the community in industrial arts, mathematics and mechanical drafting, so these rooms, in normal relation-



The cafeteria has a capacity of 300, the auditorium seats 525 and the gymnasium in this unit is double size.

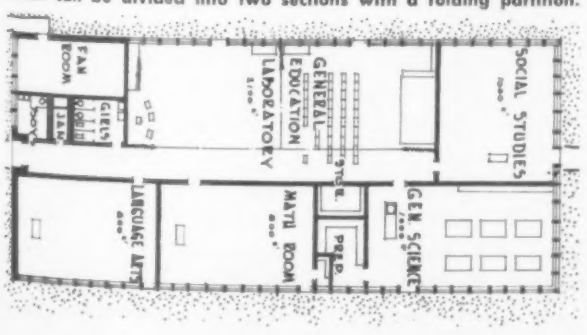
ship to each other, are in the first unit and most accessible from the driveway. There is an outdoor paved area for automotive work. The home arts room is included in this unit, too, as community projects in home canning and freezing are anticipated. Also accessible to the public for evening use is the business unit which includes classrooms for mathematics, English and social studies.

Shop and home arts, the gymnasium, music and typing rooms are all noisy areas. Isolation and careful orientation not only protect the noisy areas from each other but provide the least expensive acoustical treatment for the quiet areas.

This isolation also makes it possible to open any one of the units separately for special activities in after school hours or during vacations without opening the whole school plant. No gates are needed for shut-offs. Heat, light and janitor service can be provided separately for the unit actually to be used. Thus, for special programs operating costs are cut to the bone.

The business unit and its neighbor, the library unit, work together to provide all the academic facilities for the tenth, eleventh and twelfth grades. The "learning unit" provides for a self-contained ninth grade program, and traffic on the campus between class periods is thus reduced to a bare minimum.

The Learning Unit contains a large general education laboratory which can be divided into two sections with a folding partition.





The building project for the new Senior High School in Groton, Connecticut, has been planned to accommodate a projected enrollment of 1,100 students. At least four more classroom units can be added when needed.

The Cost Per Pupil

The present enrollment of the Groton High School is 595 pupils. The main building has been designed to accommodate the entire projected enrollment of 1,100, and even then, on the basis of present enrollment, the cost per pupil for the entire project is only $1,815.13. The contract for the high school was signed in February, 1954.

The cost of the project is as follows:

Cost of building, construction only	$ 609,951
Heating and ventilating	156,239
Plumbing	41,200
Electrical work	87,086
Site work	34,500
General contract	$ 928,976
Equipment	$ 35,000
Contingencies	50,868
Professional fees	65,156
Total Cost of Project	$1,080,000

The cost per pupil of the general contract is $1,561.30, and the per square foot cost is $14.12. When the time comes to expand, nothing will have to be done to the main building. Space has been allowed for another industrial arts unit, adjacent to the first and just as large. Three more units identical in plan and construction will take care of future academic needs. These can be built without disturbing in any way the existing buildings or the functioning of the program.

It is conceivable that, by the time the future construction is needed, the educational concept of the "learning unit" with its large general education laboratory will have been carried even further. Movable storage units and display boards may be the only space dividers within the shell of the buildings except at the service areas.

We believe that whatever educational methods and techniques may be, whether the curriculum is the core type or departmentalized, the units of the Senior High School at Groton will prove to be flexible enough to serve the program of tomorrow.



A terrace adjoins the cafeteria of the Junior-Senior High School.

DEVELOPMENT OF A SMALL CAMPUS-TYPE HIGH SCHOOL



by WILLIAM D. MOYLE

Supervising Principal, Edgemont School, Scarsdale, New York

William D. Moyle has been a supervising principal in Edgemont for the past 17 years. Before that he was head of the English departments in the Danbury, Connecticut, and Scarsdale, New York, High Schools. Mr. Moyle has an A.B. degree from Wesleyan University and an M.A. from Teachers College, Columbia University.



and WARREN H. ASHLEY

Architect, West Hartford, Connecticut

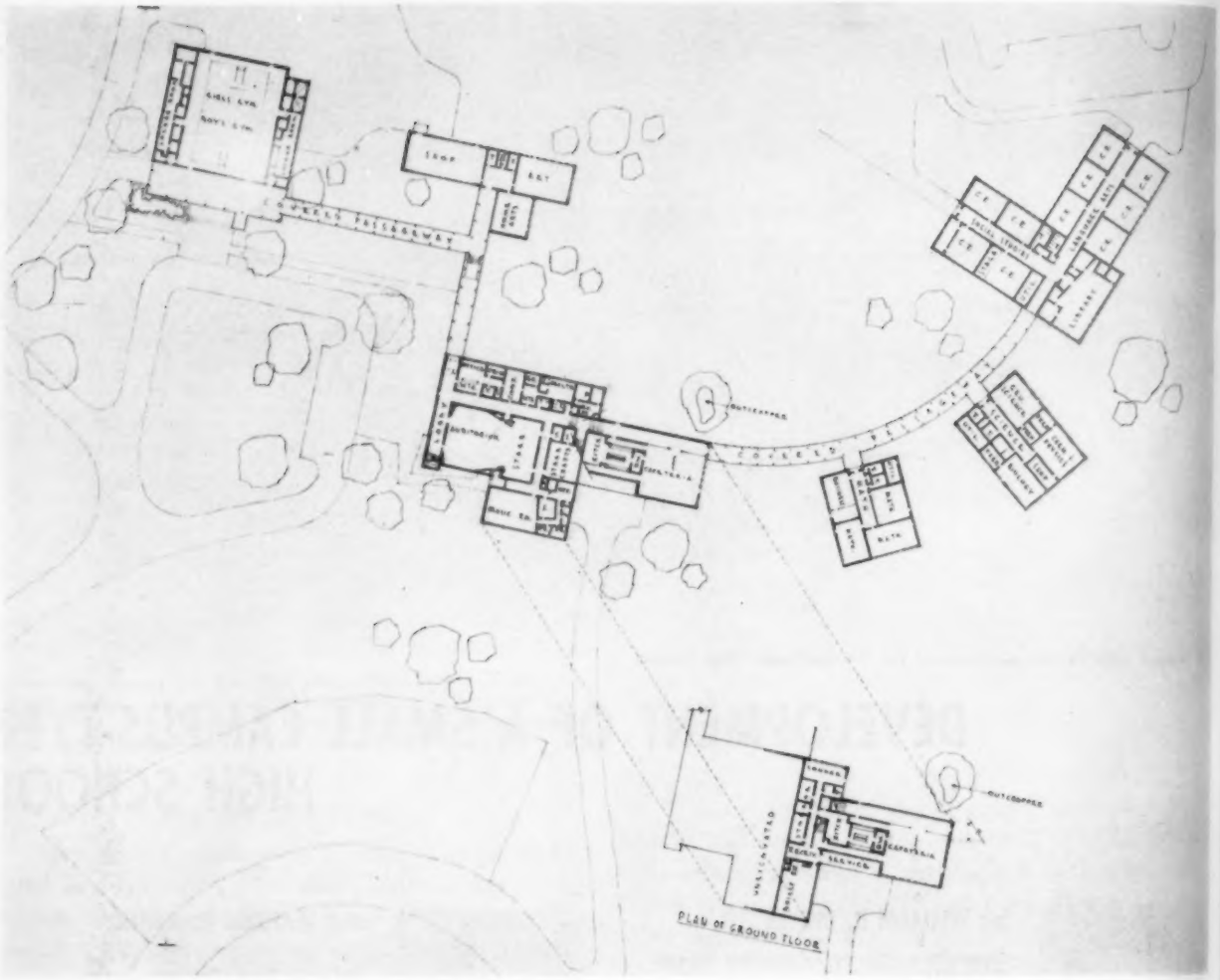
Warren H. Ashley received his Bachelor of Architecture degree from Syracuse University. He has designed over thirty school projects since World War II and was the first architect in New England to design public schools on the unit or campus plan.

EDGEMONT, New York, is a residential, suburban community adjacent to Scarsdale, using the Scarsdale telephone exchange, railroad and post office. It is nevertheless a completely separate and distinct area in the Town of Greenburgh. The Edgemont School District, with no industries and only a few stores, is similar socially and economically to the school district of the village of Scarsdale. Most of the men commute to New York City where they have executive positions. There is approximately $22,000 of assessed valuation behind each pupil.

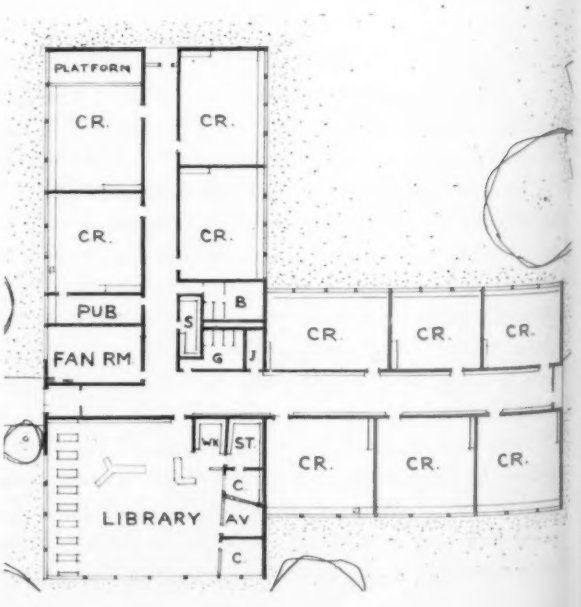
Over the years at least 85 percent of the pupils enrolled in the Edgemont junior high school have completed their high school education and have attended four-year liberal arts colleges or their equivalent. Frequently better than 95 percent of the youngsters have continued their education beyond high school.

In 1939 the Edgemont School District petitioned the New York State Education Department for authorization to erect a high school. This petition was rejected and, since then, high school pupils have been attending the schools of neighboring communities—Bronxville, Scarsdale and White Plains—all on a tuition basis. After World War II, increases in population indicated that within a very few years these schools would no longer be able to house our pupils.

Studies were made by boards of education and by citizens' committees; various alternatives were considered. It soon became evident that the people of Edgemont wanted their own high school, however small. On May 31, 1949, the Board of Education acquired



Six separate units of the Edgemont Junior-Senior High School are connected by a covered passageway. The social studies unit, shown below, includes ten classrooms, a library, the fan room and several small auxiliary areas.



the only large property available for purchase in the school district, 40 acres of rugged, rocky land, heavily wooded and on a series of hills. A year later an adjoining 30-acre tract was received by the board as a gift, making up what is now known as the "scenic seventy."

In the spring of 1953, with existing school buildings already occupied beyond capacity and with increasing enrollments indicated in the census figures, the community authorized the Board of Education to take action. Mr. Warren H. Ashley of West Hartford, Connecticut, was selected as architect with Mr. Nicholas L. Engelhardt, Jr., of Engelhardt, Engelhardt and Leggett, New York City, as educational consultant. They were given instructions from the board to work closely with the school administrators to produce educational specifications and preliminary drawings with all possible dispatch.

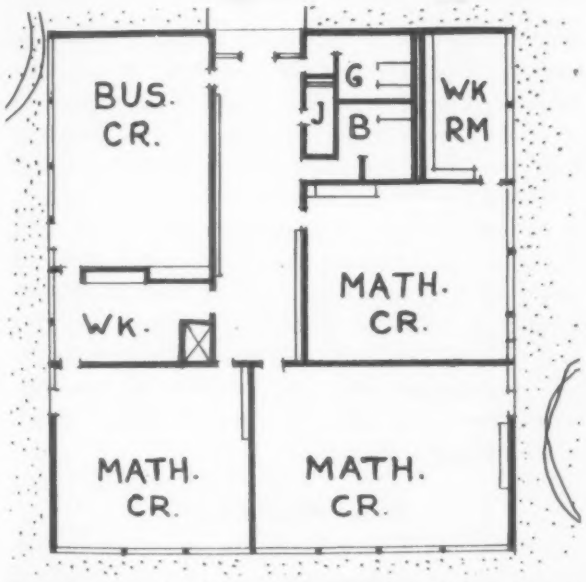
Educational Specifications

The homogeneous character of the Edgemont School District, socially and economically, simplified the establishment of educational specifications. The high percentage of pupils who continue their education

beyond high school made it apparent that the chief educational need of the community was top-notch preparation for college. At the same time, ample opportunity should be provided for the expansion of vocational training and the development of avocational interests in the creative fields of art, music and drama. The atmosphere was to be informal and conducive to a broadening of extra-curricular and social activities.

The auditorium, gymnasium, cafeteria, library and arts areas would be accessible for adult use and able to function independently for separate activities. Outdoor social areas and classrooms were to be incorporated in the site planning.

Space analyses, taking into consideration traffic circulation and orientation of components in addition to the requirements of the educational program itself, quickly showed that the use of a conventional or closed



The mathematics unit includes four classrooms and two workrooms.

plan on this horse-shoe shaped rock ledge was virtually impossible, even if the cost of the necessary rock excavation would not have been prohibitive. A single large building would also have required large scale removal of trees. The athletic fields and playgrounds alone would require extensive clearing and levelling, since there is not a single, cleared, level area on the whole site. The uneven shape of the property, combined with the steep gradient, restricted the area further for practical building purposes. It became obvious to the architect and to the land-planner, Mr. Charles A. Currier, also of West Hartford, Connecticut, that to achieve the aims of the educational specifications on the "scenic seventy" meant spreading out the component facilities into a group of units.

Campus Plan Concept Accepted

The concept of a unit or campus-type plan was accepted by the Board of Education after thorough discussion of the validity of its broad educational applicability and practical economy. Preliminary plans for the school were completed late in November, 1953. The community approved a bond issue of 1.75 million dollars in December by a vote of 10 to 1, for the erection of the proposed junior-senior high school. The budget, as submitted to the State Department of Education, was set up as follows:

General construction	$ 953,000
Plumbing	64,000
Heating	153,000
Electrical work	102,000
Site	200,000
Equipment	100,000
Reserve	50,000
Commissions, fees, etc.	106,320
Total	$1,728,320

Bids for general construction were received in April, 1954. Low bids were as follows:

General construction	$951,500
Plumbing	$ 67,682
Heating	$164,240
Electrical work	$102,250
Site	$261,485

The increased figure for site work is caused by the inclusion of a football field and cinder track. Bids were accepted the same night as the bid opening. Ground was broken in May, and it is expected that classes will be held in the new buildings in September, 1955.

Following the educational specifications closely, the final plans called for a school plant to consist of six buildings that will handle an enrollment of 550, even though the present requirements are for 425. Any further increase in the future can be handled by the construction of additional units.

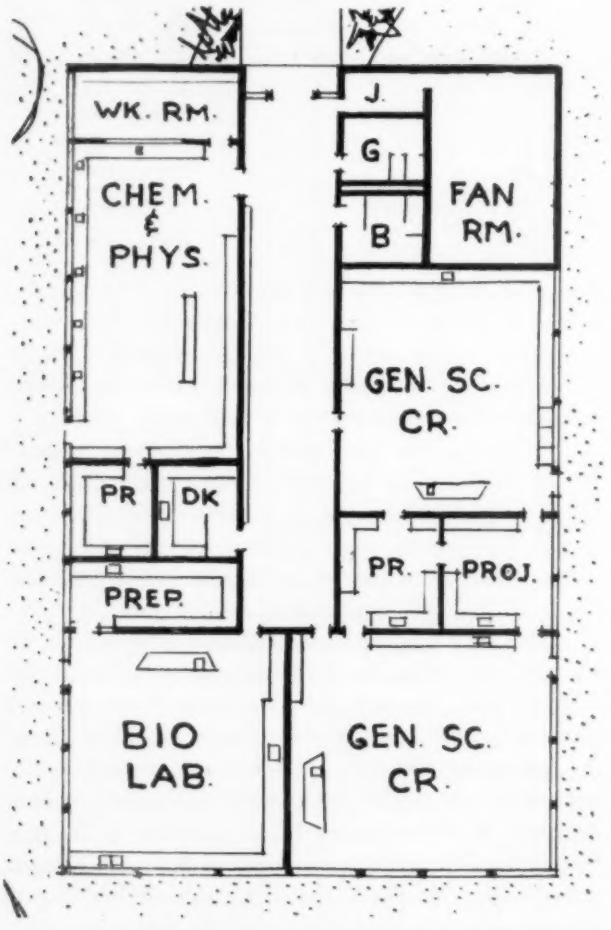
The double gymnasium will seat 1,200 easily. In addition to regular locker rooms, showers and toilet facilities for boys and girls, there are coatroom and toilet facilities for use by the public. The location of the gymnasium building on the site assures accessibility for use by the public and there are adequate parking facilities. It is also nearest of all the units to the athletic fields. A covered passage leads from the covered porch across the front of the gymnasium building to the arts unit, also accessible for use by the public.

Arts and Crafts Program

Each year only one or two pupils, while attending schools in neighboring towns, took advantage of available vocational courses. The Board of Education and the administration, under the leadership of Mr. Engelhardt, decided that, although the main emphasis of the program must be academic, opportunities must also be

provided for pupil exploration of the arts whether for vocation or avocation. The enrollments in home arts, fine arts and industrial arts are expected to be small at first. Nevertheless, each room has over 1,000 square feet of floor space so that a program in each one of these arts may be established. Integrated programs will undoubtedly be developed by the teachers for projects that will use the facilities of all three areas. In the architect's own experience attractive equipment and display and the vigorous participation of even a small number of students in a lively and varied arts program provide an inducement for many of those whose interests are primarily academic to join in the fun. Each of the three main rooms in this unit has window walls on two sides and a display case facing the lobby.

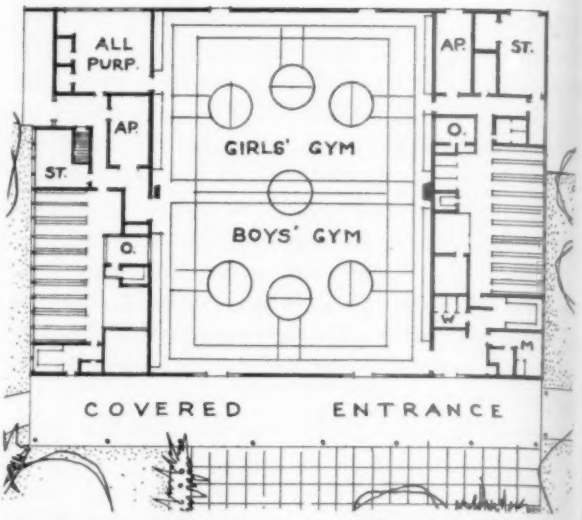
From the arts unit the covered passage leads to the administration unit. At the upper level, besides the administration offices, guidance and health areas, there



Areas for science instruction consist of rooms for chemistry and physics, biology and general science. Auxiliary rooms are included.

is a suite of rooms for the teachers. Here, also, is a workroom provided with typewriters, ditto and other essential machines. Separate rest rooms and lavatories for men and women adjoin the workroom.

The music and stagecraft areas are grouped around the auditorium. Because of the existence in a neighboring school of an auditorium seating 500 and because of the capacity of the new gym, the new auditorium has been conceived primarily as a place for pupils to learn skills and develop ideas by putting on their own productions. The auditorium will seat 300. It is 49 feet long from the front of the stage to the back of the room and 50 feet across the back of the room. The proscenium opening is 35 feet 6 inches. Walls and ceiling have an acoustical treatment built into the construction and finishes. The stage, however, is 30 feet deep and the backstage area nearly 60 feet wide. Excellent equipment will make possible a rich experience for students in the fields of music and drama and their allied arts and techniques.



The gymnasium building is located near the athletic fields and has facilities for public use. The double gymnasium will seat 1,200.

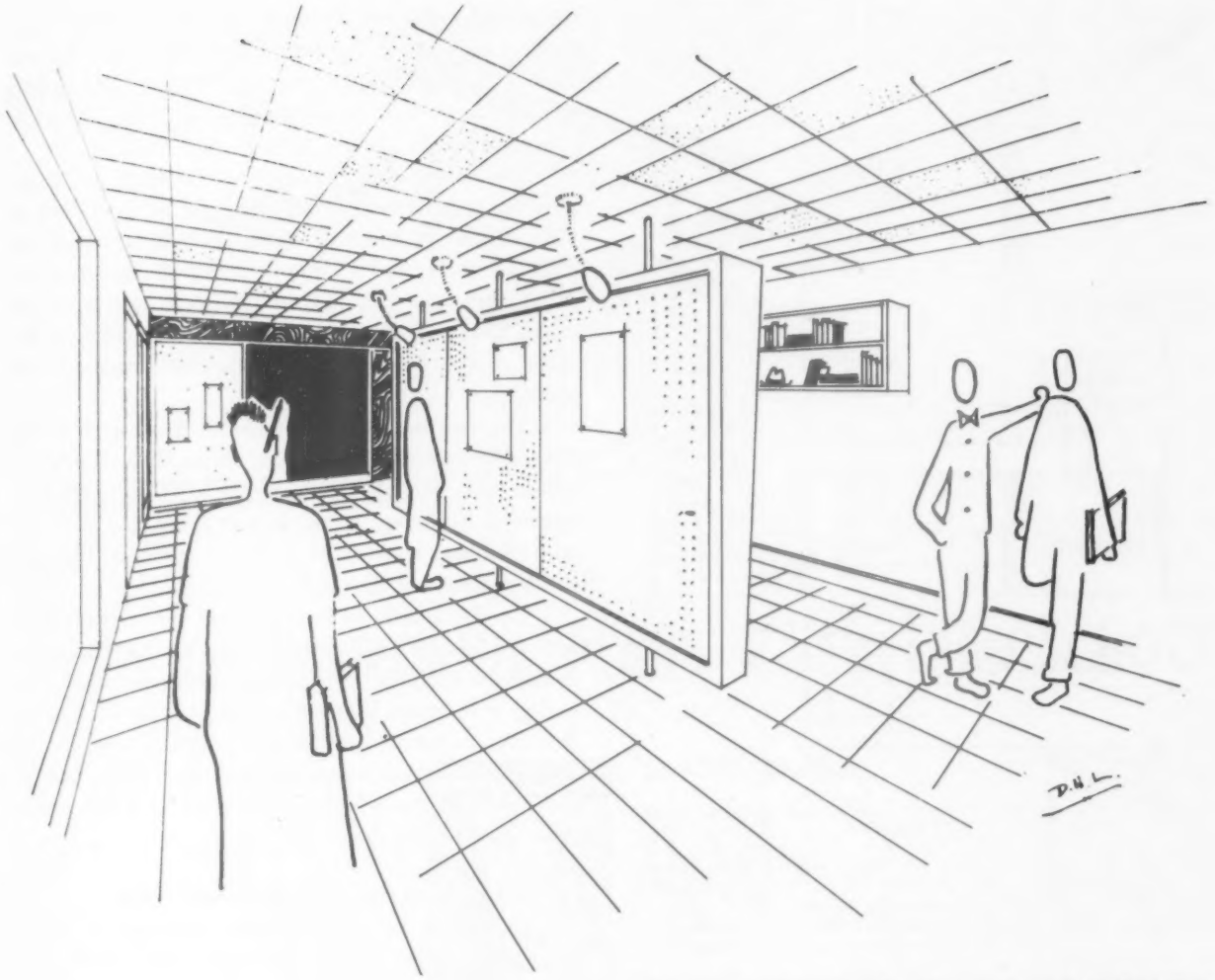
Large Music Center

There is a large music center adjacent to the auditorium which will provide opportunity for vocal and instrumental instruction and practice for individuals, small groups and large groups. The stagecraft room, close to the auditorium stage, will enable some students to work on sets for future productions even while other activities are under way in the auditorium. There will be storage spaces for musical instruments, scenery, costumes, props and equipment.

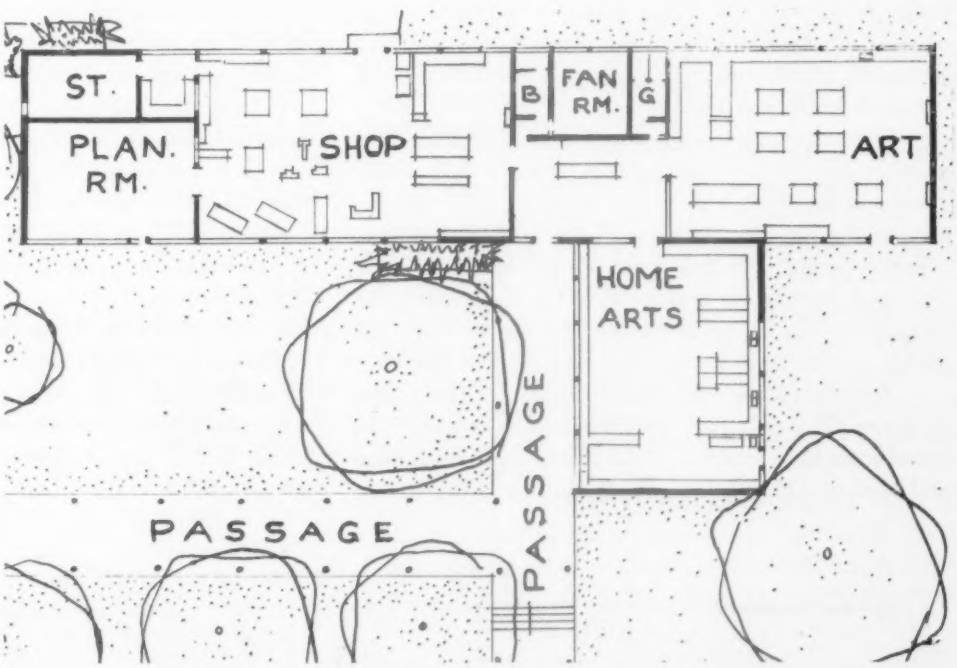
On the lower level of this same unit, reached either by stairs from the upper level or directly from the outdoors, is the cafeteria which will seat 200 at one time. There are convenient shelves for books and hooks for coats. The area has been designed so that individual rooms may be curtained off for use as a teachers' dining room or where small student groups may meet while they eat.

Outside the cafeteria is a paved terrace for use by the students during fair weather throughout the year. Both terrace and cafeteria are planned as social spaces for students and adults, for informal study or meetings.

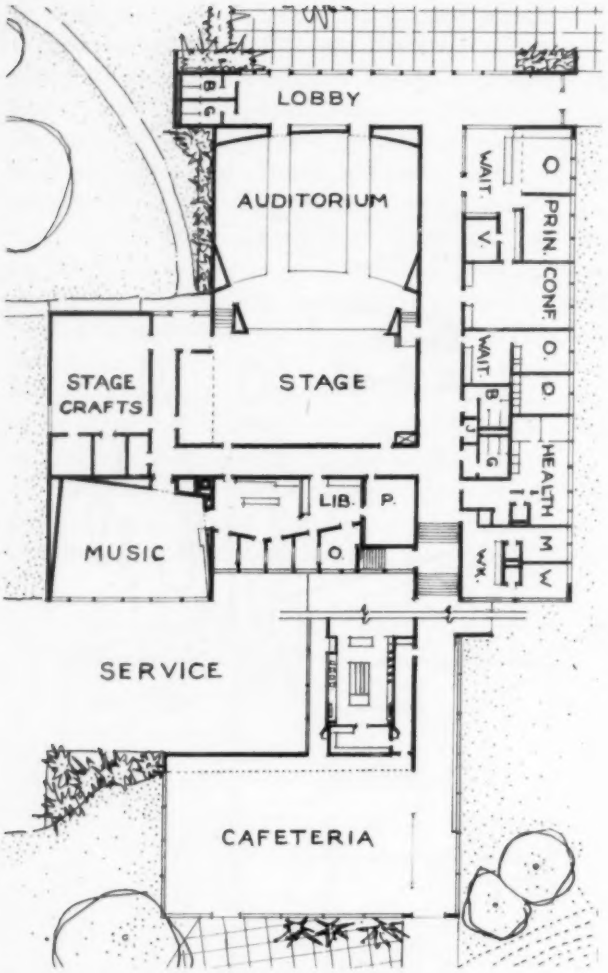
On the same level as the cafeteria, under the audi-



The arts and crafts section has three main rooms. Each of these has a display case which faces the lobby. There are also pinboards in the lobby for additional displays.



Each room of the arts and crafts unit has over 1,000 square feet of floor space. It is hoped that integrated programs will be developed for projects which will use the facilities of all three areas.



Main building of the Junior-Senior High School houses the administrative offices, auditorium, music room, cafeteria and kitchen.

torium, are the kitchen and building services. The boiler room supplies steam which is piped through crawl spaces beneath the covered passages to fan rooms in the other unit buildings, where it is converted into a warm air heating system.

From the cafeteria the covered passage leads in a graceful arc to the mathematics, science and social studies units. Each unit is placed to take full advantage of the uneven contours. In the math unit it was possible to put the fan room in one corner of the basement, leaving the rest unexcavated and making the most of foundation walls required by the terrain, thus saving in the total square foot area of the building.

The educational specifications called for classrooms to house 25 pupils each and the square footage was raised from the standard 660 to 880 in most classrooms and to over 900 in a few. Work shops or work spaces were created for classrooms in all subject matter areas for the purpose of increasing the possibilities for student projects, stimulating pupil interest and making possible individual experimentation by the more advanced students in each area.

Rooms are arranged so that teachers and pupils working in allied areas will be able to work with all the facilities of those areas. Each unit has boys' and girls' lavatories and a janitor's closet. In the short corridors there are box lockers for books and hooks for coats. Each classroom, with only a few exceptions because of the drop in grade, has direct access to the outdoors.

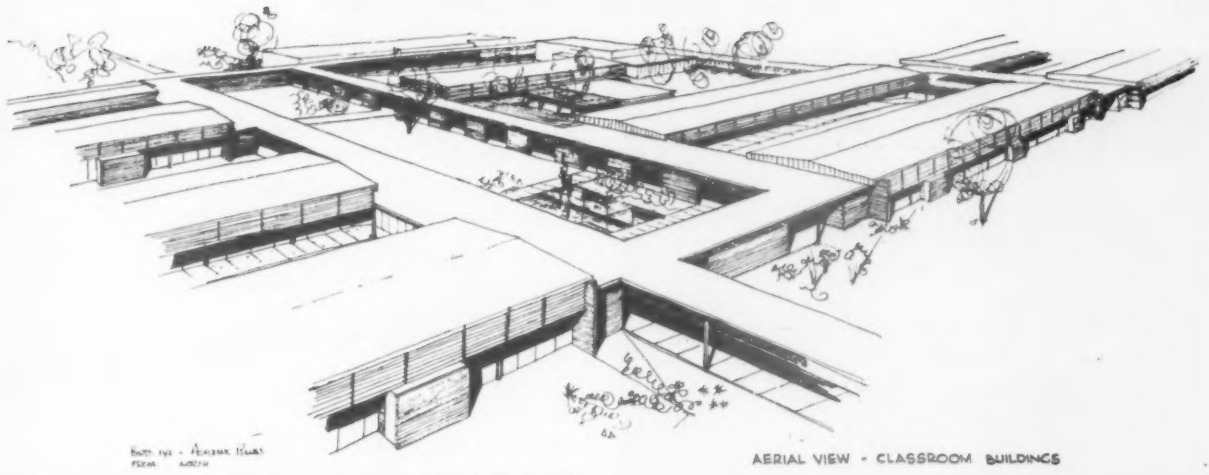
The mathematics unit includes three math rooms, a business room and two work rooms. The science unit houses two general science rooms with a project room between, a biology room, a dark room and a physics and chemistry room with its own work room. Generous sized preparation rooms are also provided.

In the social studies unit are ten classrooms of various sizes, all well above the minimum, one of which contains a platform for informal dramatic productions and speech study. There is a special room for the production of student publications. The library area, in addition to a work room and a storage room, has two conference rooms which, by means of a folding partition, can become three.

Cheerful and Informal Plant

The plant as a whole, with outcroppings of rock and much of the wooded area left intact, will have an air of cheerful informality and friendliness. Porcelain enamelled steel panels below the glass areas of the window walls will be a uniform gray to blend with the tan of the brick surfaces. Above the glass areas the porcelain enamel of the steel panels, in glowing colors, will be arranged in carefully studied patterns to add variety, richness and warmth to the whole.

It is sincerely believed by all those concerned with its planning that this unit-type junior-senior high school will inspire both faculty and pupils to experiment cooperatively in the development of a college preparatory program that will produce citizens fully aware of their responsibility to take part in all aspects of their society, both at school and in the community. Boys and girls with rich interests beyond the academic and yet possessing first class college preparation should be adult contributors to our community life. Space, quiet, informality, friendliness and inspiration can be found in any school, but we hope that our unit-plan school will highlight them.



Aerial view of the classroom buildings for the new high school at Riverside, California. The school has three project architectural firms. These buildings were designed by Caughey & Ternstrom.

RIVERSIDE, CALIFORNIA, PLANS A NEW HIGH SCHOOL



by BRUCE MILLER

Superintendent of Schools, Riverside, California

Superintendent Miller began his career as the principal of a small elementary school in the Imperial Valley. Later he became the principal at Ramona and Placentia; and was appointed the superintendent of schools at Ontario, California, in 1940. He has been with the Riverside City Schools since 1951.

VOTING school bonds or boosting tax limitations to finance new schools or additions is a long, low-gear pull, but if the superintendent and his staff can still smile after the last vote is counted, the shift into high should be made with dispatch. Once having decided in favor of school expansion, the public is eager for action. They want their new schools right away, and if the dirt isn't flying within a few weeks, they threaten to "look into the matter."

If things have been moving along as they should be, teacher-administrative planning committees have settled their differences and have come to an agreement about improvements for the old plant. Costs have been figured and re-figured with desperate courage.

Most important, the architect or architectural staff will be ready to go; better, they will have been on the job for some time. When money is finally available, there should be no long wait for site utilization planning before preliminary drawings can be authorized, leading to the actual working drawings.

Happy is the superintendent who can crawl out from beneath a bundle of blueprints long enough to wave cheerfully at contemporaries and to prove to more caustic critics that the big job is moving "according to schedule."

In Riverside, California, where school enrollments have grown more than 50 percent in four years—from 10,500 to 15,800—and where there is no letup in sight, timing is a vital factor. In late April, 1954, the High School District voted $3,000,000 in bonds for construction of a long-needed second senior high school. The vote was counted on a Tuesday night and on Wednesday morning four architects, already appointed, already in full agreement as to their respective assignments and already well advanced in site planning, really went to work.

While "division" of a major school job is not unusual, several factors are noteworthy with regard to the Riverside plan of procedure. First of all, there was no question in the minds of trustees concerning the quality



Henry L. Wright, pencil in hand, is the consultant architect for the new high school. The project architects are, left to right, Milton H. Caughey, Herman O. Ruhnau and Bolton C. Moise, Jr. In the right foreground is Robert T. Cox, assistant to Mr. Wright.

of work and operational efficiency of school plants designed by the three architects receiving alternate assignments in the Riverside City School System. Consequently, it appeared only logical to appoint them to work jointly on the new high school. In this respect the school board followed the suggestion made by the architects themselves.

However, the $3,000,000 project was larger than any secondary school built in the immediate area. The design phase exceeded the available capacity of any single, local, architectural office without forcing the sacrifice of normal practice, and above all there was the element of time to be considered. Accordingly, the school board decided to combine the talents and facilities of the three local firms as project architects actually designing buildings, with the leadership, research and experience of a larger firm as consultants.

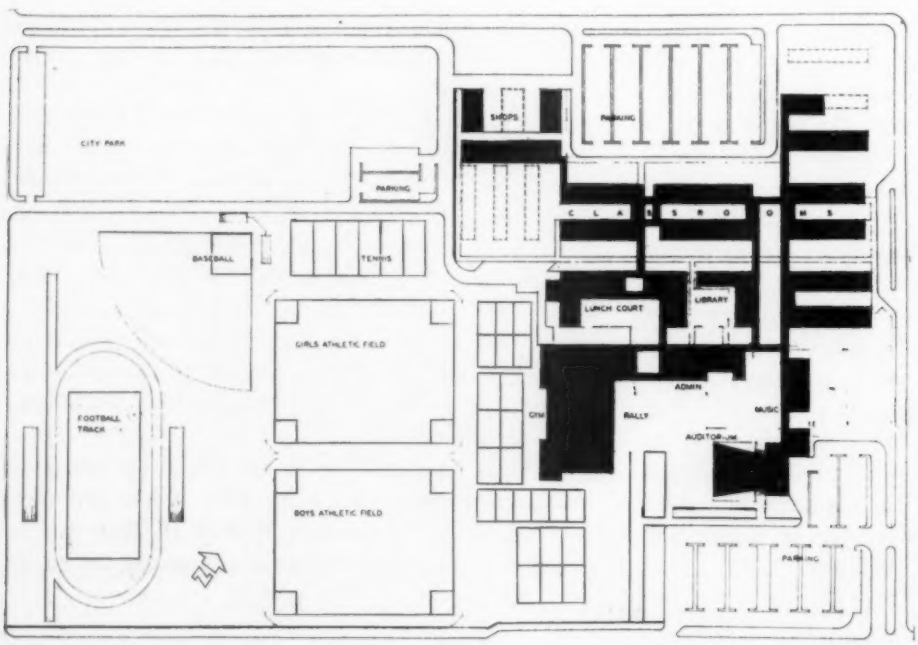
The Consultants Are Selected

Trustees and administrators were not long in learning that the Los Angeles firm of Kistner, Wright and Wright was highly recommended not only by other school systems but by other architects as well. Interviews with Henry L. Wright followed. An agreement was reached, and within a short time Mr. Wright had begun once again to prove not only his professional genius, but his great capacity to get along with people and to smooth out every difficulty.

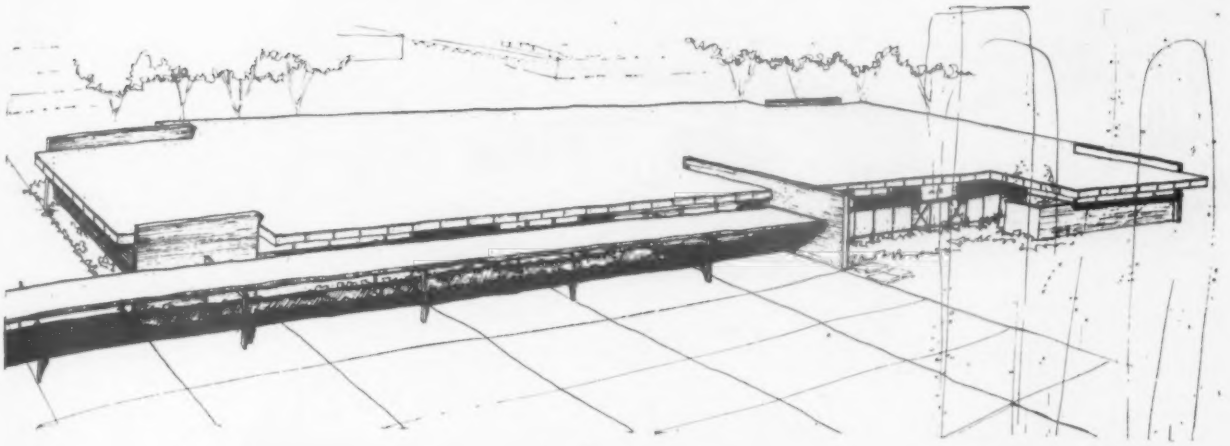
Under Henry Wright's leadership the consulting firm studied the educational program projected by the school district staff and trustees before developing master plans and controls. The arrangement differed from the usual use of consulting architects in that their services did not cease when preparation of working drawings was begun by the project architects. Administrators and trustees were convinced that the leadership and coordination of the consulting architects were necessary throughout the program, and that this follow-through leadership was highly important to the success of the project.

The obvious success of the venture thus far has proved to the local district that it is possible to use the individual services of local architects and still benefit by the research facilities and coordinating work of a larger firm of consulting architects with specialized experience in major school projects.

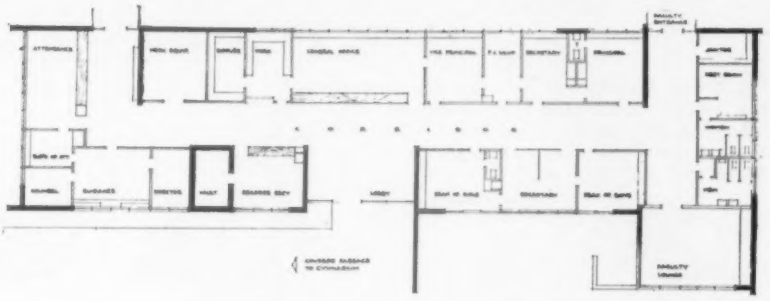
The planning of the new school followed democratic procedures throughout, with various citizens committees asked by the district to work with the school board and staff in developing plans. One assistant superintendent was charged with coordinating activities of the committees and faculty groups. Then the educational program was given to another assistant



Site plan for the new senior high school for Riverside, California. The major units are the shops, classrooms, lunchroom, library, gymnasium, administration section, auditorium and music rooms. Ample parking facilities are included in the site plan, and a city park immediately adjoins the whole area.



The administration building has been designed by Herman O. Ruhnau, architect. The areas included are an attendance office, guidance office, deans' and principal's offices, a general area, rest rooms and a faculty lounge.



superintendent who worked with the architects. This approach has the disadvantage of being a little slower in preliminary phases than other methods, but the advantages outweighed a mild early lag and brought to bear the combined talents and study of many.

The Projects Are Assigned

Architect Herman O. Ruhnau of Riverside was assigned the design of gymnasium, shower and locker buildings, shops and administration building, and the coordination of all specifications and contract documents as well as responsibility for supervision of construction of the entire project. In this task he has available as consultants the other project architects in connection with the buildings they have designed individually. These architects are Bolton C. Moise, Jr., of Riverside, in charge of site development, auditorium and cafeteria, and the firm of Caughey and Ternstrom of Los Angeles. The latter are in charge of all academic classrooms and special rooms.

The entire project will be bid in one lump sum contract in order to take advantage of size and to obtain the lowest unit cost. The contractor, however, under the agreement, will be responsible to only one architect.

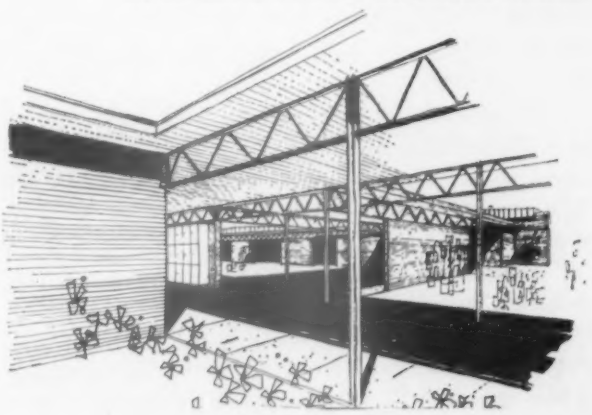
Psychological factors have favored the arrangement from the beginning. The school board has respected the abilities of all architects involved and the architects, in turn, have had confidence in each other. Thus there has developed a true pooling of experience and facilities.

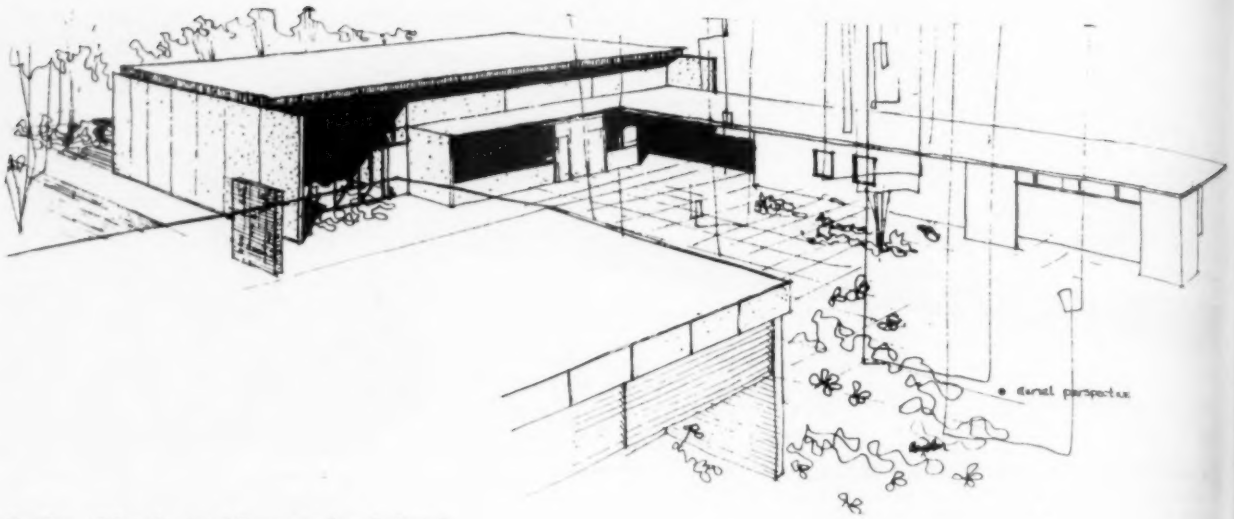
Careful cost controls have been effected. First, there were frequent meetings with trustees and written confirmations of all decisions. During preliminary planning, all matters requiring board decision were brought up for discussion as they arose, so that when the preliminaries were completed they reflected the board's wishes. Complete preliminary plans were approved before the architects proceeded with working drawings, and a detailed estimate was made based upon the preliminary plans. Another estimate will be made upon completion of the working drawings.

Capacity of the School

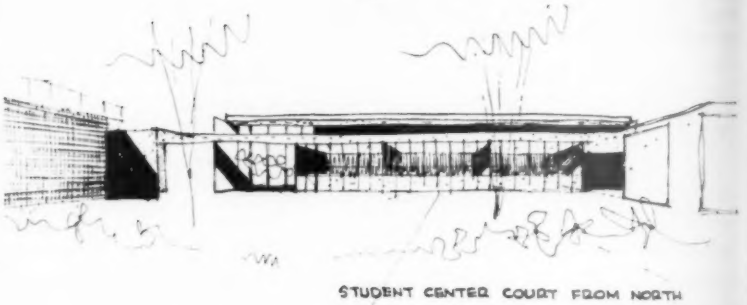
The high school will house 1,500 students at the outset and will be expanded to a capacity of 2,000 or more later. All of the unexpandable facilities were grouped in the first phase. These included the audi-

The plans for the central court and covered passages are the work of the firm of Caughey and Ternstrom.





The firm of Caughey and Ternstrom has designed the building which will house Riverside High School's student center. The building has its own outdoor court and is connected to other areas by covered passages.



STUDENT CENTER COURT FROM NORTH

torium, cafeteria and administration building as well as portions of the gymnasiums including tournament court, shower and locker facilities.

One Story Structures

While the underlying philosophy behind the finger plan is being followed, the plan breaks away from the usual regimented series of buildings and achieves a more campus-like atmosphere with a series of courtyards formed by the classroom buildings. The plan incorporates one story structures, with single-loaded corridors and bilateral lighting. The buildings are grouped by departments, with homemaking and art together and the academic rooms also together. Grouped separately are the industrial arts shops. A vocational arts department was not included because facilities for this program were deemed adequate at the existing Polytechnic High School where the enrollment is nearing 3,000.

A pleasant feature of the planning is the creation of wide areas for student outdoor lunching and rally space on the campus, which gives an air of freedom. The student center is combined with the multi-use room. The library is located centrally for easy access to all departments, particularly those dealing with the academic subjects.

Facilities for driver education, a most important subject in a state with nearly 6,000,000 motor vehicles (there are 80,000 automobiles in Riverside County alone), are provided in the new school. These include a street inside the campus where students may practice driving and parking.

Traffic Is Regulated

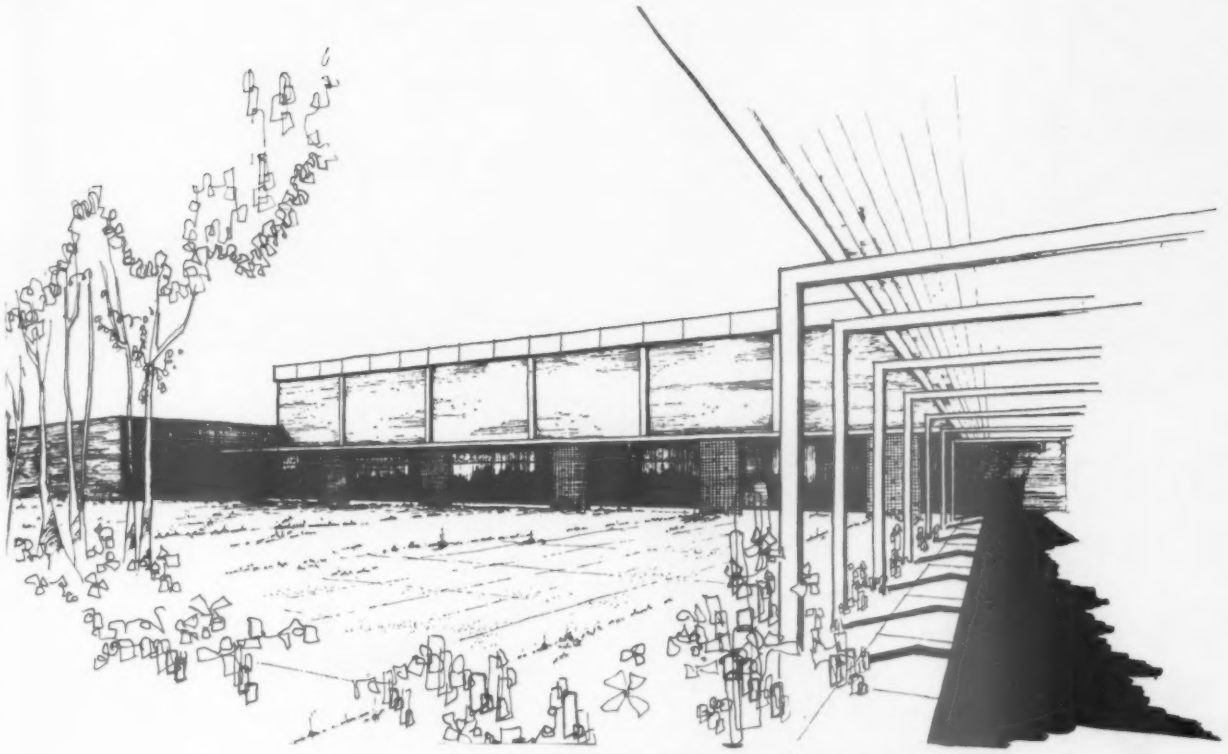
As a safety precaution, transportation access is arranged so that buses deliver and pick up students at a point different from that used by private automobiles. Planning of traffic access to the school required a series of conferences with the city traffic department, the Chief of Police and the State Division of Highways, since the site is bordered on one side by a state highway with one-way traffic.

Traffic will be routed one way in the morning and one way in the afternoon within the campus, and safe access to and from the highways is provided by deacceleration zones. Service roads connect the various buildings.

Integrated Recreation Facilities

Another feature of the new campus is planned integration of the school's recreation facilities with those administered by the city. Seven acres of the 60-acre site have been set aside for development of a park, the central feature of which, according to present plan, will be a school-public plunge operated all year.

The site was laid out so that parking is convenient to those facilities to be used by the public, such as the recreation areas and the auditorium. Tennis courts and



The gymnasium building, by Herman O. Ruhnau, architect, is adjacent to the boys' and girls' athletic fields, the baseball and football areas and the tennis courts.

playfields as well as shower and locker buildings may be used without opening the entire campus.

Another convenience to the public is the location of the multi-use building and auditorium so that they may be found easily without a guide. This accommodation factor holds true of all facilities to be used by both school and community. The main athletic field has bleachers for 5,000, again with easy access and parking.

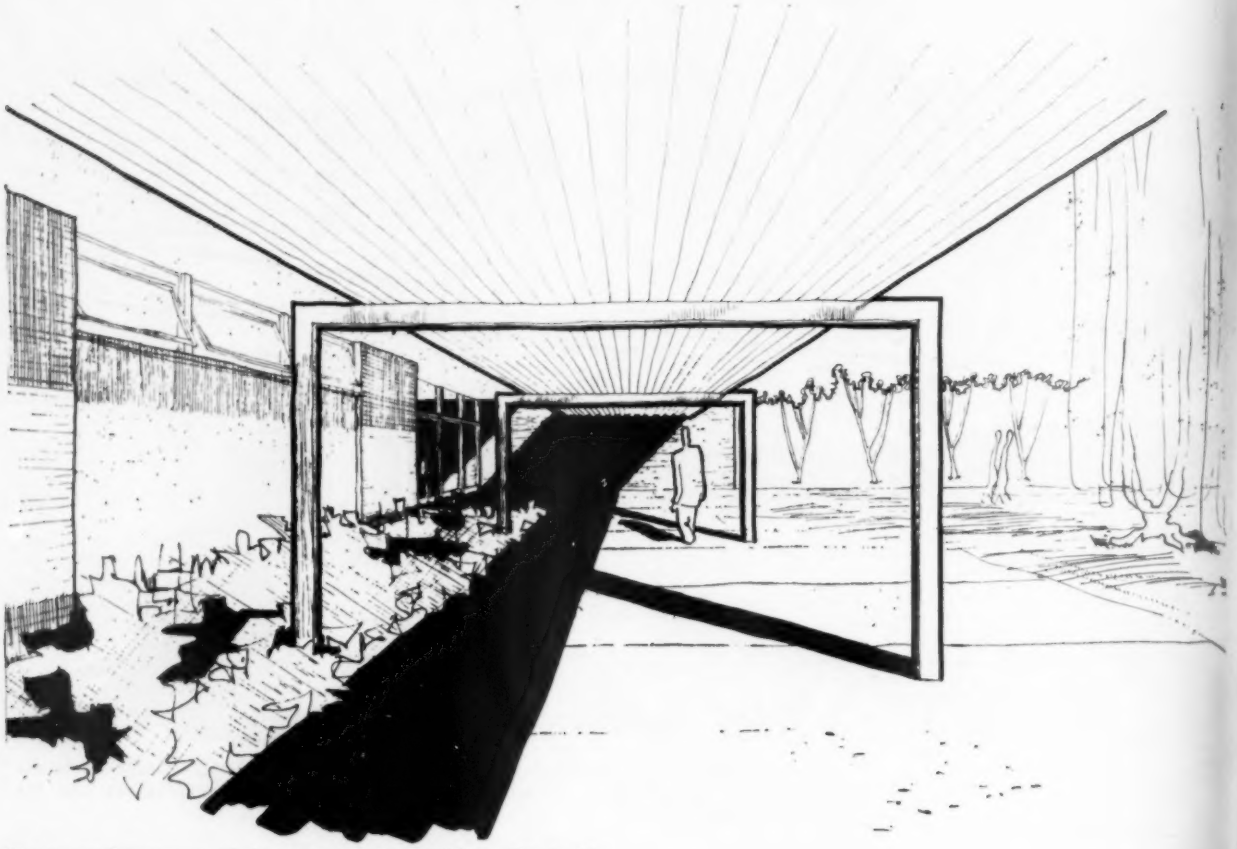
Structural Considerations

Building construction will make use of reinforced brick with steel sash, gravel roof and concrete floors on fill—stock items will be used whenever possible for economy. All outside doors will be of metal for low maintenance. Because of the warm climate, the heating and ventilating system was planned to maintain good circulation of air in the rooms, with forced air being circulated through the concrete floor and into the rooms through grilles in the window sills. This system provides the advantage of mechanical ventilation and radiant panel heating with little lag. Glare control is achieved with a minimum use of louvers by the placement of classroom buildings so that each serves as a sky shield for the others.

Discounting unpredictable factors such as a tieup in building materials, the new school will open in Sep-



Lockers for the high school students are located in a covered passageway.



The covered entryway of the administration building. This building also has a separate faculty entrance which leads directly to a rest room, toilets and the faculty lounge. The main entrance opens into the general lobby and office area.

tember, 1956—and to a full house. One thing is certain. If emergencies arise, they will not be the fault of the architects. The grumbling will have to come from some other source, for the man with the plan is a pretty cheerful sort of fellow in Riverside right now. He knows he won't be found out on the end of a limb all alone with a bear underneath.

The joint planning venture, with citizens of Riverside in various committees, the school board, faculty and administrative staff, three project architects and a consulting architect all involved, appeared at first to be cumbersome and susceptible to hopeless conflicts of opinion. But, in this case, the venture worked very well and the school district and the people of Riverside feel their building problem in secondary education has been well solved.



Jos. G. Kennedy

LYNNWOOD JUNIOR HIGH SCHOOL IN EDMONDS, WASHINGTON



by WILLIAM ARILD JOHNSON

Johnson and Botesch, Architects-Engineers, Everett, Washington

A graduate of Washington State College, Mr. Johnson has continually engaged in school planning. He began his own practice in 1938, specializing in school architecture. Mr. Johnson's firm conducts continuous research in school planning and in improving methods of construction.



and HAROLD E. SILVERNAIL

Superintendent of Schools, Edmonds, Washington

Mr. Silvernail has B.S. and B.Ed. degrees from Washington State College. He taught vocational agriculture at Edmonds High School for ten years and became an assistant superintendent in 1951. Mr. Silvernail has been superintendent of schools since August, 1954.

THE superintendent speaks: our new Lynnwood Junior High School is the product of many hours of planning. Before the architect began any work on paper, many hours were devoted to preplanning. This preplanning first included a public meeting to which lay people in the school district were invited. During the meeting the program for a junior high school was thoroughly discussed and all proceedings were tape recorded for play back at the architect's office. After public opinion had been considered, especially in regard to the curriculum which would be offered to our junior high school children, the preplanning engaged the opinions of the professional staff, janitors, clerks, nurses and maintenance personnel. As each phase of a junior high school was discussed, the professional staff expressed their own ideas of what should be offered.

The individual classroom was a topic for lengthy consideration. The professional group advanced their own ideas on adequate heating and lighting, classroom colors, chalkboards, bulletin boards, type of floor covering, windows, darkening devices, storage spaces, etc. Opinions varied, depending upon the past experience of the teacher. One item meeting the unanimity of teachers was that adequate space for displaying pupils' handiwork was a wise investment. Almost every teacher agreed that the present room in which he was teaching did not have enough bulletin board space nor enough display cases. They agreed that displays were important in stimulating a student to do his class work.

In our new junior high school each classroom has a display case opening onto the hallway, and the entire back of the room is covered with a bulletin board. There is additional bulletin board space on each side of the chalkboard in front of the room. The furniture in the room is as flexible as possible and the ingenuity of the teacher is not curbed for lack of the proper facility. The light, attractive colors together with adequate heating, lighting and ventilation, make the classroom a delightful place in which to work.

Special rooms received a great deal of attention from the special teachers, many of whom are, for the first time in their lives, using teaching spaces that they helped to plan. The big factor, emphasized over and over again by all special teachers, was the need for adequate storage spaces for student projects and teaching materials. We believe that Lynnwood Junior High

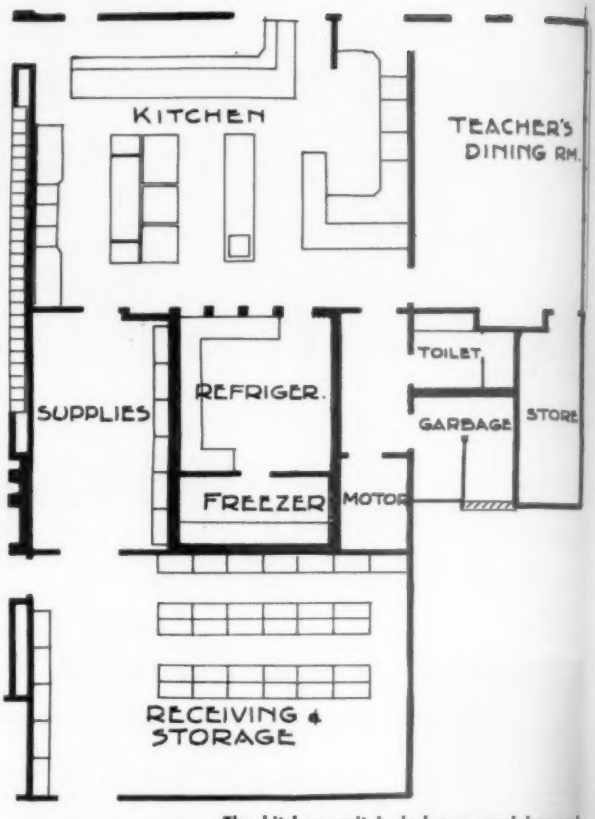
School has adequate storage spaces to meet all the needs of a good teaching program.

Our library, which includes the instructional materials center, is really the heart of the instructional program as far as teaching materials are concerned. It is planned so that visual aids and all other instructional materials are under the direction of the librarian. The one story construction of the building makes possible mobile library units which are moved into each classroom when needed. The library itself is sufficiently large to accommodate two classes at one time, should this be necessary. It is attractive, well lighted and well planned from the standpoint of operation and programing.

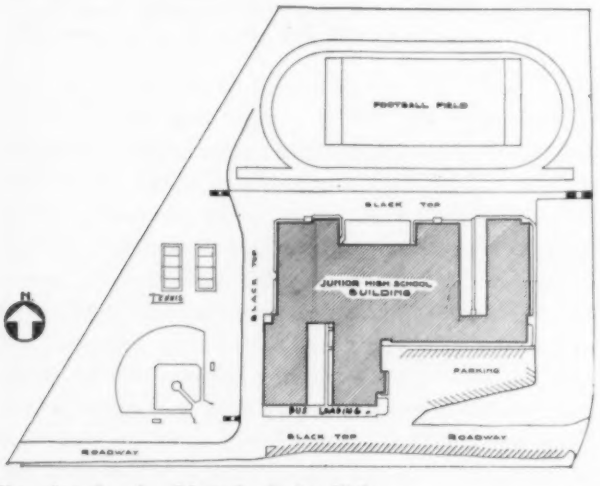
Other Special Areas

The health clinic is located adjacent to the office. Nurses are not available at all times and supervision of this area can be made from the office. The clinic is also planned and arranged so that the front workroom space can be utilized for different purposes when not in use as a clinic.

The health and physical education facility is planned for flexibility. The boys' gymnasium can also double as an auditorium. The showers can be reached from either the inside or outside and are planned so that a swimming pool could be added to the building at a future date. The locker rooms would then become dressing rooms. The gymnasium is large enough for four teaching stations to operate at one time.



The kitchen unit includes a receiving and storage area and a teachers' dining room.

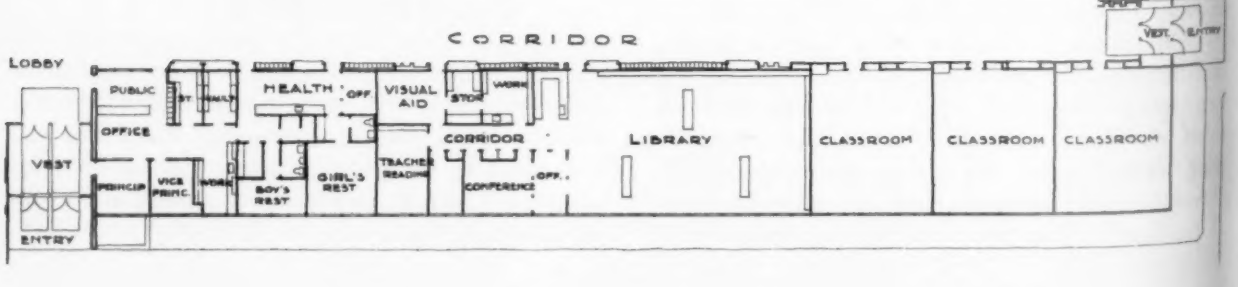


Site plan for the Edmonds Junior High School. Johnson and Botesch, architects.

Vocal and instrumental music rooms are located near the stage. All music rooms are acoustically treated, with practice rooms adjacent to the main rooms and proper instrument, robe or uniform storage. These rooms are also arranged on different levels so that each child can be seen by the instructor at all times.

A special teacher's room was planned and constructed in the building to provide a place for teachers to meet and work on an informal basis. It is also available as a smoking room for teachers. The room has a built-in electric stove, electric refrigerator and dish storage. Coffee can be served to committee or faculty member meetings held here. We feel that this room adds materially to the morale of our teaching personnel.

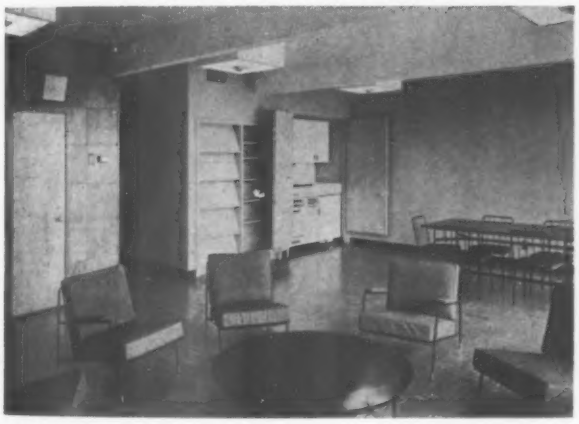
A special display room has been incorporated into the arts and crafts department of the building. Student



The administrative, health and visual aid areas are located near the library and several classrooms on the main floor.



This recitation room in Lynnwood Junior High School has light birch furniture, with built-in cabinets and bookshelves along the far wall.



The teachers' room has a kitchen unit which can be concealed behind doors when not in use.

The main office has an Arizona sandstone wall and a north clerestory for bilateral light.



projects, made in the art room, craft room or the shop, can be displayed for all students in the building to see as they pass by this well lighted area.

Offices and Home Economics

The offices have been located near the front of the building for ease of access. There is an automatic clock and bell system and a public address system on which the principal can call each room. Teachers can also call the office from their classrooms.

The home economics suite is planned so that all girls can have home economics training in the 7th, 8th and 9th grades. A sewing and a cooking laboratory have been planned together with a utility room for laundry, etc., and a dining room in which the girls learn the fine graces of family dining services. The dining room is located across the hall from the cafetorium and kitchen so that each area complements the other. We feel we have a wonderfully planned and most usable school in which the programing was carefully studied before construction.

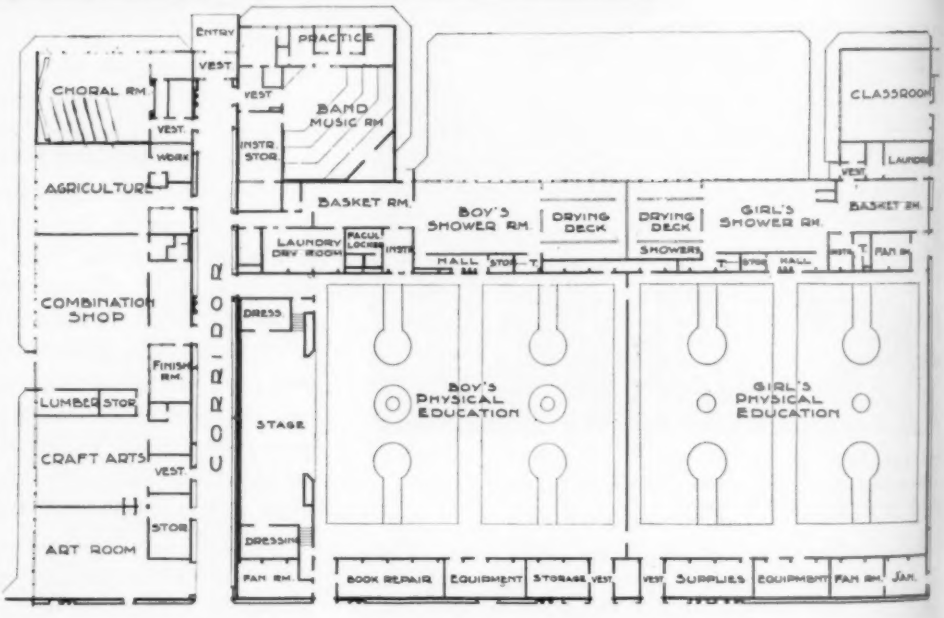
The Architect's Story

The architect speaks: this is the latest school project in the rapidly expanding Edmonds, Washington, School District. Our firm has completed several other grade schools for the district, and we are now planning a new 20-room grade school, our tenth school job at Edmonds.

We have found everyone connected with the Lynnwood Junior High School project to be most cooperative and it was a pleasure to work with them. This school represents a triumph of collaborative effort. Over a year was spent on preliminary planning alone.



High overhead monitors reduce glare in daylighting the combination boys' gymnasium and auditorium.



The girls' and boys' physical education areas are flanked by the arts and crafts and shop rooms of the Lynnwood Junior High School. The band and choral rooms are also nearby.

Everyone participated–the administration, principals, teachers, citizens' advisory committee and the State Department of Public Instruction. We wish to acknowledge gratefully the assistance given by Mrs. Pearl A. Wanamaker and her staff of consultants and experts who were most helpful in the development of plans of special rooms. Mr. John W. Goddard, superintendent, and Mr. Harold E. Silvernail, assistant superintendent (superintendent since July 1, 1954) deserve special commendation for their inspiration and leadership and for the excellent educational specifications they supplied. Good educational specifications are all too rare in the school building field, and their value and usefulness are a real benefit to subsequent architectural plans.

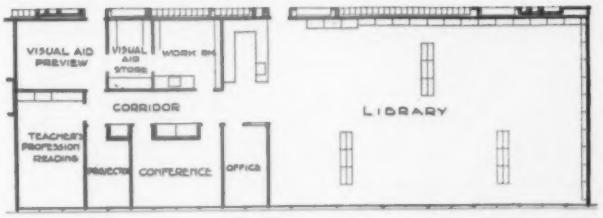
Most of the joint conferences held with the administration, teachers and advisory committee were tape recorded. They were then played back for the drafting force in our office. It is essential that the people making the drawings be fully apprised of the philosophy, aims and needs of the school district.

While plans were being drawn the rough site was completely leveled, at the suggestion of the architect. There are no steps in the entire building, inside or out, except those to the stage. The complete 17-acre site was leveled, graded and prepared before construction contracts were let. The building area itself comprises almost three acres.

We made several trips around the country investigating some of the best and latest trends and ideas in junior high schools. Acknowledgments here to Dr.



The library has floating bookshelf units which can be moved on quiet wheels. Eggcrate fluorescent fixtures are supplemented by clerestory daylight. There are darkening drapes for all windows. The library area includes visual aids and conference rooms.



William T. Gruhn, Professor of Education, University of Connecticut. We feel that a junior high school is a very specialized type of building, the aims and needs of which are not clearly understood by everyone. Every attempt was made to incorporate the fitting and desirable ideas and features into this structure. The building is unusually complete and well equipped, with all special equipment a part of the building cost.

Aims of the Building Design

Our aims were simple: (1) we wanted to cooperate with everyone concerned to give them a building that would fit and serve their educational needs; and (2) we wanted to design as economical a building as possible, getting the utmost in value. Because of the accelerated increase in enrollment since the war, the district was really hard put to provide enough teaching facilities. Most of the children have been attending classes on double shifts.

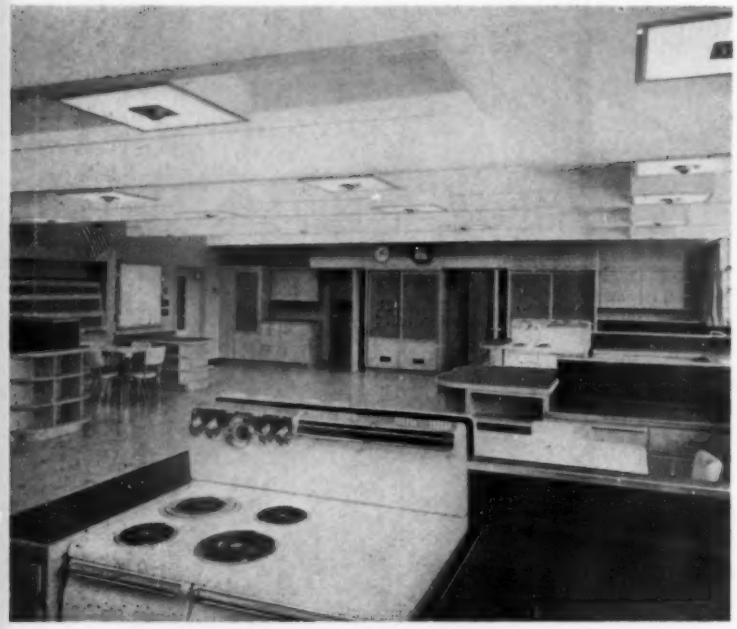
There are separate physical education rooms for boys and girls. The boys' physical education room is provided with a stage so it can double as an auditorium. All shower and locker rooms face the play field. The music department is situated at the far end.

A prominent place in the educational theme is given to the library and audio-visual education. The multi-service room is used for small club and social gatherings as well as for a lunchroom. It is expected to be used almost nightly by the community.

Much thought was given to natural daylighting. The gymnasiums have no wall windows; all light comes from overhead monitors. In all classrooms and in some other rooms we employ bilateral lighting, using low outside windows and high sloping windows over the inside wall. The corridors are lighted mostly by "blisters" or plastic bubbles. The homemaking, arts and crafts and shop rooms are lighted by sawtooth monitors facing north.

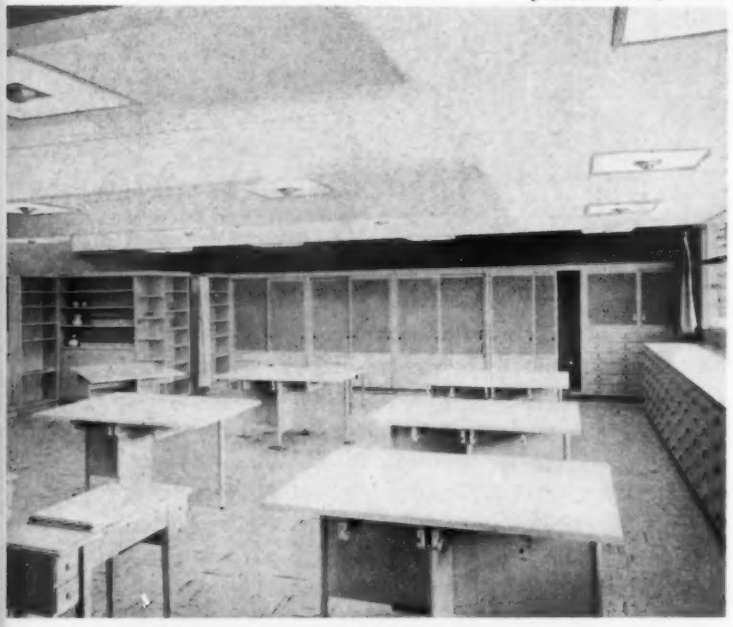
The construction is of concrete up to the window sills with frame exterior walls above that. Interior walls are frame with lath and plaster. All roof construction is with glued laminated beams or arches 8-foot on centers covered by 2 by 6 boards and rigid insulation.

Very careful planning has gone into fire controls. Eight-inch concrete fire walls divide the building into two zones; all are complete with approved sliding fire doors. Not only does the building have built-in interior water lines for fire but, in addition, four outside fire hydrants are located close enough for effective use of fire hoses. Earthquake bracing is provided. Heating is



The homemaking room has ample area and equipment to accommodate the students enrolled in the classes.

Jos. G. Kennedy Photos



The sewing room adjoins the cooking area. Broad tables are provided for cutting out patterns.

by radiant pipe in concrete floors. A low chimney was possible by use of forced draft.

Economical but Complete School

Many people ask us how we have achieved such low costs. First, we want to emphasize that this is *not* a cheap building. In fact, it is an unusually complete building. We have spent extra money, and we hope wisely, on floors and wainscots wherever there is unusual stress and punishment. For instance, all floors and wainscots in rooms with plumbing have genuine ceramic tile for low maintenance and attractive appearance. All ceiling areas are covered with acoustic tile. Generous grating areas are provided at all entrances to arrest the tracking in of dirt. Light fixtures in the gymnasium and auditorium are on hangers to facilitate relamping. Floors in both gyms are 1 and 1/16-inch maple, set over an insulation of waterproof mastic. Special floor conditions are covered with different and appropriate flooring materials. All counter tops in the kitchen are stainless steel; other counter tops are covered with formica. Windows in areas of high impact risks, such as gym monitors and clerestories, are glazed with heavy plexiglass.

To continue on the subject of economy, we have been working with school districts for 26 years, most of them poor districts. We could not help developing a rather thrifty attitude about schools. For some 15 years we have been working more and more with prefabrication and modular planning, always stressing economy, simplicity, repetition, mass production and use of stock materials, but *not* cheap materials. We try to save money where feasible and practicable, but we also spend extra money in many places to reduce maintenance costs.

The Lynnwood Junior High School is believed to be the lowest cost junior high school in the State of Washington. Glued lamination and modular design methods for speed and economy on the job have helped to keep the cost of the school at $10.83 per square foot.

Modular Design Throughout

We reduced the variety of structural design conditions to an absolute minimum and reduced the number of fastenings through continuity. Modular design is adhered to throughout. Only 29 glued laminated arches are required to support the entire 88 feet by 224 feet athletic pavilion.

There are over 500 glued laminated beams and arches in the entire structure. In addition to their speed and economy of use, they are design assets from several standpoints. The clean simple lines of the school are a key feature to its attractiveness. Also, the laminated members assure fire and earthquake safety.

The school is planned for 40 teaching stations and has an enrollment of 1,200 students. It was occupied on September 7, 1954.



Sprague

All members of the school staff should help to determine equipment needs. The students, also, are able to offer helpful suggestions.

SELECTION OF EQUIPMENT IN HIGH SCHOOLS



by LEO M. CASEY

Assistant Superintendent for Business, Scotia-Glenville Central Schools, Scotia, New York

Dr. Casey is a graduate of Manhattan College and received his master's and doctor's degrees from Teachers College, Columbia University. His experience includes service as a high school principal and a consultant in financial accounting. He is co-author of a booklet on public school machine accounting.

DURING the past decade the primary focus of school construction and rehabilitation programs has been concentrated upon providing facilities for elementary pupils. With the record elementary enrollments of recent years now beginning to ascend into the secondary schools, the problem of selecting equipment for high schools is demanding more and more time of school personnel.

In equipping elementary schools the task is simplified by the relative uniformity of rooms and contents. Except for kindergartens and a limited number of special classrooms, there is little difference in the equipment needs of elementary classrooms. Sizes, shapes, quantities and finishes may vary somewhat, but basically the equipment needs of a sixth grade are similar to those of a first grade. This uniformity of items among elementary grade levels greatly simplifies the definition of equipment needs.

When we examine the equipment needs of the typical high school we find a markedly different situation. The diversified programs offered by a departmentalized staff necessitate procuring a tremendous variety of items. Consider the difference in equipment of a metal shop and a woodworking shop, both units of the same department. A comparison of these with requisites for the chemistry laboratory, the senior English classroom and the office practice room, renders some measure of the magnitude of the selection process.

Equipment is the ingredient that transforms bricks, mortar and steel into a functional school building. The level of efficiency of a high school structure is closely allied with the selection of its equipment. An ideal

building floor plan is futile if the equipment utilized is of poor application, design or workmanship. Conversely, substantial limitations of the structure can be overcome by the wise employment of furnishings.

Everyone Can Help

The selection process should be closely identified with the staff that will ultimately work with the equipment. The starting place, then, for developing equipment needs is with the school's personnel—not only the teachers, but all members of the staff. Sometimes the thoughts of the student body will be most helpful and they should be solicited.

The custodial and maintenance staff should not be restricted to voicing opinions regarding the locations of slop sinks or the type of vacuum cleaner to be purchased. Rather, they should be encouraged to cite their experience with all sorts of equipment. Their day by day duties give them an awareness of the upkeep problems of many items of equipment. The custodian will know which type of furniture is equipped with a glide that raises havoc with asphalt tile floors. The maintenance man is familiar with the excellent replacement parts service available for a certain line of equipment. These considerations should be included in any discussion of equipment.

The business of selecting equipment will be most profitable if several rules of procedure are followed:

1. *The selection process should begin early.* For new buildings the selection of equipment should begin as soon as preliminary building plans are considered. Built-in equipment requirements should be determined prior to the development of final plans and specifications for inclusion in the construction contracts. The addition of built-in equipment items after contracts have been awarded is a costly procedure.

Since equipment purchases are usually among the final actions in construction programs, it is important that sufficient funds be reserved for such expenditures. All too frequently school districts have "over-built" their new schools at the expense of inadequate budgets for equipment and furnishings.

The process of selecting equipment for high schools already in operation should be a continuous one. While actual purchases may be deferred until the appropriate budgetary period, an ongoing selection procedure enables a thorough examination of available products and insures an early awareness of new devices.

Sometimes equipment which is selected for use in more than one situation is really too complex for the teacher or student to operate. Care should be taken to avoid such a mishap.



Involve All Concerned

2. *It should involve all concerned.* It is the persons who will utilize the equipment who have the greatest stake in proper selection procedures. They should have an active part in the selection process. Usually, this means a committee operation.

Because of the departmental method of instruction, many equipment needs for a high school can be determined on a department basis. The art department staff is obviously the most capable agency for determining art department requirements. This is also true of the staffs for science, home economics, music, physical education, business, industrial arts and other special fields.

School-wide committees might best be able to determine equipment for academic classrooms and facilities utilized by the entire school.

Defining Responsibilities

3. *Those selecting equipment should be charged with definite areas of operation.* Nothing weakens the process of participation more than the lack of meets and bounds. When a group is charged with the responsibility for recommending equipment purchases, it should be kept informed of the factors which limit the articles to be selected. If a 240-volt electric line is not available in the kitchen, the selection of ranges must be limited to the non-electric variety. And when it is not the group's responsibility to concern itself with a particular item of equipment, it should be so informed to avoid wasted activity.

If a limited sum of money is available, the group should be cautioned against over-selection of equipment. This cautioning must be done in a manner that will not discourage thinking for future needs.

4. *It should be subject to review by school administrators.* While staff participation is wholesome, it must not be permitted to degenerate to the point where the legal responsibilities of the superintendent as chief

administrative officer are abrogated. The deliberations of staff members should be considered advisory in nature.

Reporting to the Superintendent

Once the various individuals and committees have made concrete proposals, including specific items and cost estimates, they should present a report in writing to the superintendent of schools or his representative. Conferences with individuals and committees will help clarify points not covered in the written report. When all individual and committee reports are received, it becomes the task of the superintendent or his representative to coordinate the requests, decide on their relative merits and so approve or disapprove them.

If it is necessary to prune individual requests, some system of priority must be employed. Rather than have administration arbitrarily curtail a portion of the items requested, a sound approach is to have the equipment selection committee participate in determining which items are to be deleted or deferred.

5. *Maximum use should be made of non-staff resources.* State education departments frequently furnish excellent information regarding equipment needs. Many state universities provide materials which are of assistance in selecting equipment. The U.S. Office of Education has several handbooks on equipment requirements.

Professional organizations, such as the American Library Association, often prepare printed materials containing equipment recommendations. Personnel in other school districts where equipment procurement programs have been recently completed can furnish many suggestions based upon first-hand experience. Educational consultants, expert in the field of schoolhouse equipment, are being retained by an increasing number of school districts.

Equipment salesmen are willing and able to make suggestions regarding types of equipment, applications and layouts. Further, they can submit price estimates which are usually a factor in the selection process. A sufficient number of salespeople should be contacted to insure familiarity with competitive products.

Equipment with aesthetic qualities will add to the attractiveness of the school and dispel the institutional appearance of the past.





Make sure the equipment ordered is the proper size for the student.

Criteria for Selecting Equipment

A list of criteria for the selection of equipment in high schools would include:

1. *Serviceability*—Are replacement parts available? Can standard parts be employed? Can custodians, with simple tools, perform repair jobs? Can the surfaces of desks and tables be refinished?

Reputable manufacturers maintain a stock of repair and replacement parts for the equipment they sell. Since the need for such parts increases as the equipment ages, future availability of parts is an important consideration. Further, the equipment should, wherever possible, be simple enough in design so that the custodian can carry out repair work with a minimum of skill, time and special tools.

The use of plastic tops for school furniture has become common in recent years. With reasonable care these tops should require a minimum of servicing. The increased initial cost will be more than offset by eliminating the periodic refinishing expenses necessary with wood desk tops.

2. *Availability*—Can the item of equipment be obtained when required? Is delivery guaranteed within a specified period?

The importance of assured delivery of equipment prior to the opening of school would, of course, vary with the product involved. Failure of an order for pupil seating to arrive when required would seriously disrupt the effectiveness of the educational program. Tardy delivery of such items as microscopes or tumbling mats could be minimized by rearrangement of the course of study.

Under usual market conditions established firms seldom fail to meet delivery commitments. In the event of war, strikes or materiel shortages, it is frequently necessary for school districts to compromise other considerations in order to obtain equipment when needed.

3. *Flexibility*—Can the item be employed in different locations? Does the piece of equipment lend itself to different functions? If not built-in, is it portable?

Many of the equipment units employed in high schools are designed for specific purposes and are not adaptable to other uses. However, within limitations, the greater the capacity of equipment to perform different functions, the greater the economy of investment.

The classroom sound projector, with sufficient output to accommodate an auxiliary speaker, would prove a wise selection if there is use for projection equipment in a large room, such as a gymnasium or auditorium.

Is Equipment Simple and Safe?

4. *Convenience*—Is the piece of equipment simple and safe to use? If it is to be used by high school pupils, will they be able to operate it? Is it comfortable? Should the unit be adjustable?

Equipment that is convenient to use will be employed often and effectively. When the high school office plans the acquisition of a liquid process duplicator thought should be given to the convenience factor. If the machine is to be operated by the teaching staff for the preparation of class material, tests, etc., an instrument that is designed for utmost simplicity of operation will enjoy optimum use.

5. *Durability*—Will the equipment stand the rigors of day-by-day use over a period of years? Are quality materials employed? Is the product soundly designed? Is the workmanship of a high grade?

To satisfy this measure the product must be sufficiently durable to last for a reasonable service period. While it is possible to overdesign the durability of an item of equipment, it is more likely that reasonable durability will be compromised for appearance or cost.

Equipment manufacturers usually have sufficient confidence in the quality of their wares to offer to replace without charge any merchandise developing defects within a reasonable time. The length of such a guarantee period varies, but replacement of defective products up to a year after delivery is not uncommon.

6. *Attractiveness*—Is the item pleasing in appearance? Does it harmonize with the surroundings in which it is to be employed?

Educators now appreciate the desirability of having schools decorated and equipped in an attractive manner. Items of equipment that are designed and finished with an eye toward the aesthetic tend to bestow a home-like charm on school buildings. Contrast this with the institutional appearance that has characterized all too many school buildings in the past.

To be attractive, the equipment does not necessarily have to be either expensive or garish. Tasteful school furnishings are available from a variety of sources and at reasonable prices.

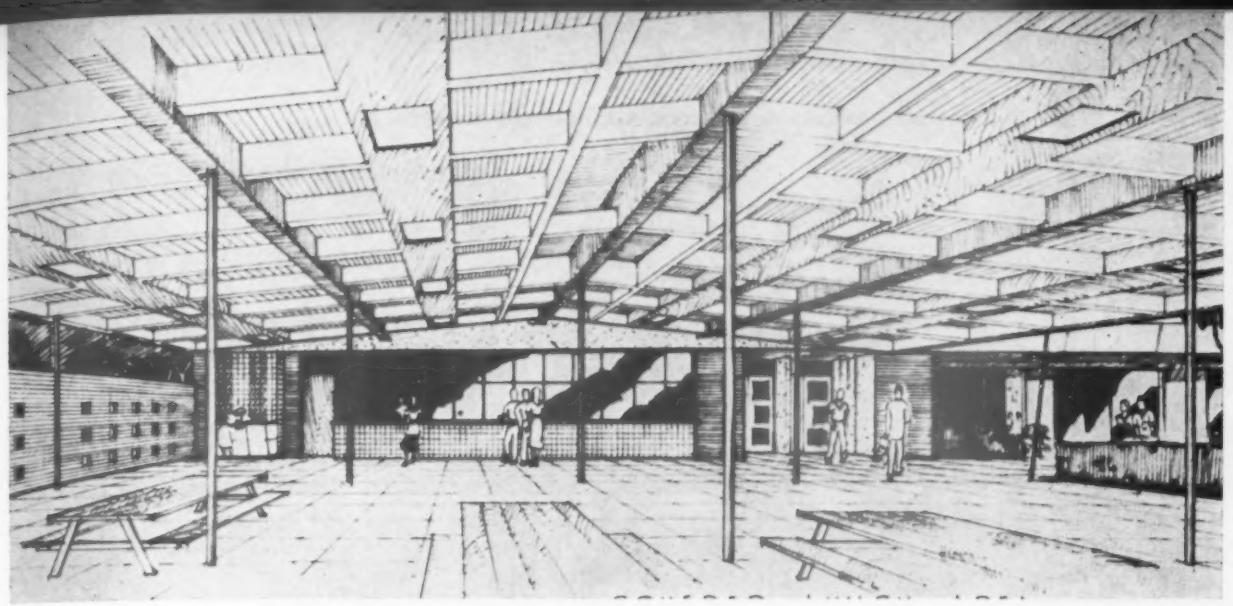
7. *Economy*—Economy denotes maximum output per dollar expended. It does not mean cheapness; for cheapness is most uneconomical. It does mean obtaining the product needed to adequately perform the task at the lowest expenditure of time, energy and money.

What Is Economy?

In determining economy we consider initial cost, because price is a factor in selecting and buying equipment. But more than initial cost must be considered. We also examine the utility of the item, life expectancy and upkeep costs to arrive at an "economy quotient." In a sense, then, economy is a composite of all selection criteria, since it represents the balanced judgment of cost versus commodity, of investment versus service.

These criteria are outlined with the realization that they are not co-equals, nor are they all inclusive. Individual circumstances will alter the importance assigned to the criteria listed and may dictate the addition of other considerations.





Covered lunch area and fountain service counter of the new Student Union at Compton College, Compton, California, Austin, Field and Fry, architects.

SOCIAL LIVING FACILITIES IN HIGH SCHOOLS AND COLLEGES



by CHARLES E. FRY

A.I.A., Austin, Field and Fry, Architects and Engineers, Los Angeles, California

Mr. Fry received his B.S. degree in Architecture at the University of Southern California. After graduation he traveled and studied in Europe. His firm conducts a general practice of architecture, and has performed architectural and engineering services for many school districts in Southern California. Mr. Fry is a colonel in the Air Force Reserve and presently commands an Air Force Reserve Squadron.

SOCIAL living facilities for students in our high schools and colleges contribute to an important aspect of school life, providing areas where students may meet informally with each other. These areas, many times referred to as social halls, student centers and student unions, are places where young people may find relaxation from the formalities of the school program and where they may participate in social activities. The scope of social living facilities varies with the school level—high school, junior college or college.

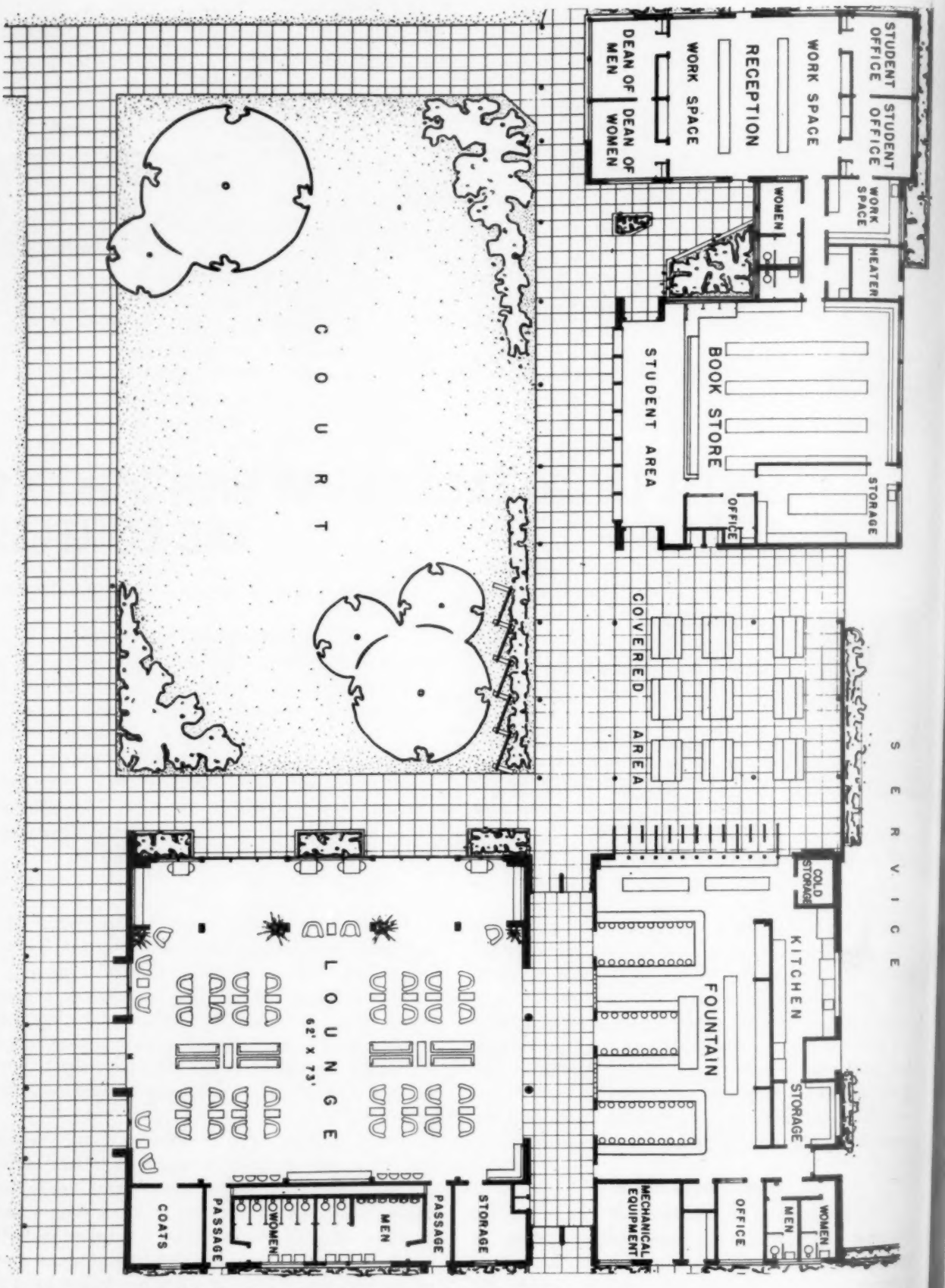
High School Areas

Much time and professional skill are devoted to planning and carrying out educational programs for secondary schools with emphasis, also, on the athletic program and other typical high school activities. Yet the high school drop out rate rarely declines and stands as a solemn reminder that today's high school program lacks sufficient drawing power and concentrated attraction to hold all of our youth for four full years.

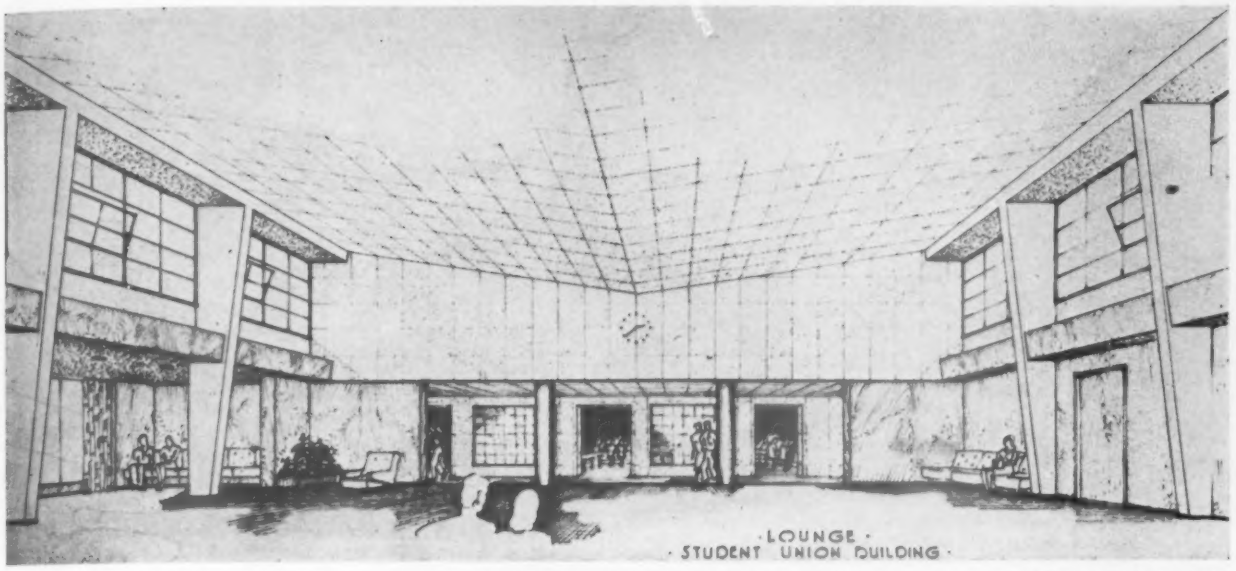
Just what is lacking, what is necessary to make young people feel that they belong in high school? Social centers will do much to create a pleasing and welcoming atmosphere in the secondary school, giving students a real sense of belonging as individuals and as persons.

Such facilities might be referred to as "meet and eat" areas and could be located next to bus loading docks, cafeterias or other central and much used spaces. They will be ideal places for holding student elections, informal dances, group discussions and club meetings. Outdoor areas can also become social group spaces with the addition of a few benches or trees.

In most high schools in Southern California there



Plan of the Student Union Building at Compton College. The building connects by covered corridor to the bookstore and administrative and student offices. The large court provides an ideal meeting place for informal gatherings of students.



The lounge of the Compton College Student Union measures 62 feet by 73 feet. The room opens onto the outdoor court and is across from the food service area.

is a distinct trend toward providing meeting places or areas where students can get together, especially during the noon hour. These meeting places are also available for such after school functions as rallies, dances, elections and group meetings. Many times the gymnasium is used for these activities.

New high school designs being developed by our office provide for an open court with buildings grouped on all sides. This court constitutes an outdoor gathering place for students and acts as a breathing area for the campus. The administration building may be at one end of this open area, allowing the principal, vice-principal or some other member of the administrative staff to proceed directly to a raised platform to address a general assemblage of the student body.

College Student Centers

Student centers have long existed on college campuses. These usually house snack bars, dining areas, browsing and reading rooms and lounges, plus other spaces to fit the activities of a particular campus. Colleges have a somewhat different problem in providing these social living areas inasmuch as many of the students do not adhere to a full daily schedule and may come and go as their courses of study demand.

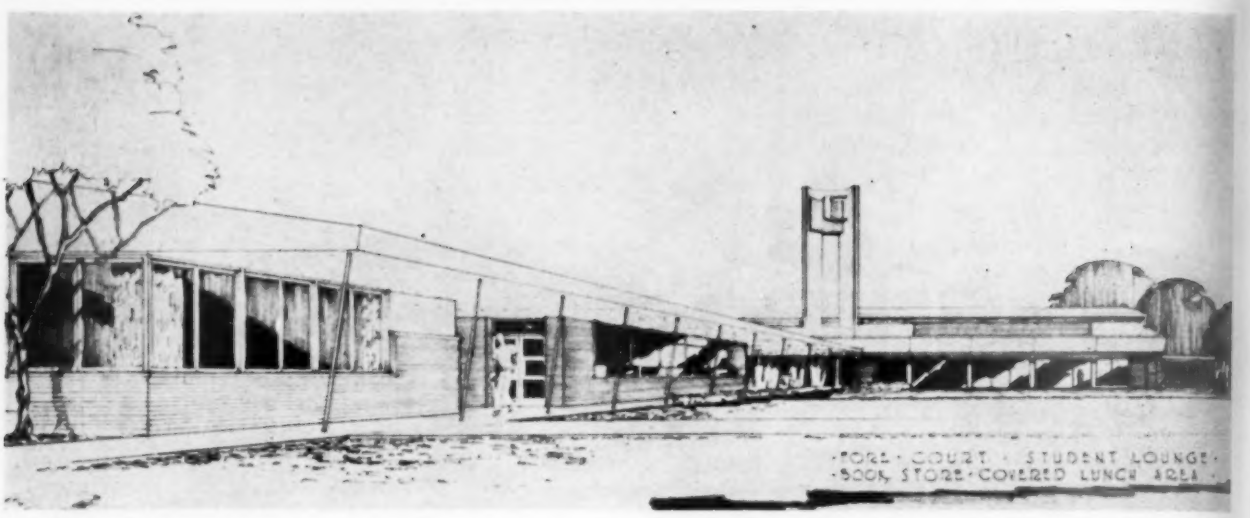
For example, at Compton College in Compton, California, the design and planning of the new Student Center was developed by our office in conjunction with the creation of an entire new campus. Founded in 1927, Compton College had shared the campus and buildings of the Compton Senior High School for 26 years. Through the interest and support of an expanding community the college has grown into an institution which now has an enrollment of several thousand day students and many more evening and extended day students. Construction on the initial phase of the master plan for the campus has been completed, including the Student Center facilities.

Used Throughout the Day

Now in everyday use, the Student Center is located at the center of the campus and is easily accessible from all areas. Its facilities are occupied and used by Compton students throughout the day. Some are studying, others are utilizing the soda fountain which is part of the building and serves hot and cold food. Outside service lines, under a covered area, provide a welcome feature for hot or rainy days.

A covered walk leads from the bookstore to the Student Union.





This view shows the forecourt of the Compton College Student Union, surrounded by the student lounge, bookstore and covered lunch area.



Julius Shulman Photos

The general construction of the building is wood frame with an exterior of stucco and brick wainscoting. The roof is covered with colored gravel, and roof insulation has been provided. All ceilings are finished with acoustical tile. The large social hall has a concrete floor slab covered with parquet flooring, and the soda fountain area has a terrazzo floor and walls, providing an easily cleaned and maintained surface.

Besides the lounge and fountain facilities the Student Center houses a bookstore and offices for the dean of men, the dean of women and officers of the student body. This entire area has been laid out so that it is accessible by all-weather traffic passages to all parts of the campus. A large forecourt provides an open gathering place for informal groups.

Pylon at the main entrance of Compton College is a landmark of the college. The Student Union is located at the center of the campus and is easily accessible from all areas.



Youth Library for Fitchburg, Massachusetts, Carl Koch, architect, has the colorful touch of a brightly painted frieze-fascia. This public library is also town's community center.

A SCHOOL LIBRARY FOR BOOKS . . . AND CHILDREN, TOO!



by CARL KOCH

Carl Koch and Associates, Architects, Cambridge, Massachusetts

Mr. Koch has a B.A. degree from Harvard College and a M.Arch. from Harvard University. His office practice has continued from 1939 until the present with the exception of four years with the U.S. Navy as an instructor and officer in charge of plans development for a radar school in Georgia. Mr. Koch's practice has included residential work, low-cost housing, schools, colleges, shopping centers, a synagogue, church buildings and product designs. He has contributed articles on various aspects of architecture to many national publications.

"IF a child hasn't learned to use and love books by the fourth or fifth grade, we've lost him for all time," stated a children's librarian recently. Admittedly she exaggerated somewhat. Plenty of life-long readers first meet and learn the enjoyment of man's treasury of knowledge at later times in life, but there is enough truth in the statement to shock one into a new concept of when and where to help children and books come closer together.

A little homework soon shows that Americans have long been aware of the needs of their children for written literature. The public children's library dates back to 1896, and the relationship between schools and libraries has been acknowledged in theory and practice for generations. The high school library has been recognized for at least a generation, but it is of interest to find that the concept of an elementary school library is relatively new and possibly unaccepted in many places. Further, it is surprising to learn that often the formal introduction of the young child to the library and its invaluable tools rests on the interest and incentive of an individual teacher—that the use of the library *per se* is left to the secondary school curriculum.

Most of us, as American parents, are deeply concerned about the effects of modern communications—radio, comics, television, records and such—on the reading habits of children. We should be haunted by a fear that too many are missing too much. To put first things first, it is obvious that an inspired librarian or teacher might accomplish more in the musty basement of a poorly designed old library than a mediocre person could achieve in a perfectly designed and equipped

children's library. However, neither in that field nor in the selection of books can the architect qualify as a competent observer. At any rate, teachers and librarians are likely to change more often than the physical plant in which they work. Good design must not only satisfy today's needs but it must anticipate tomorrow's.

Assuming, therefore, first-rate personnel, what kind of a children's library, in what location, will be most likely to attract and establish a lifelong interest in books? And at what time in a child's life will he be most susceptible? If the greatest interest in books comes in the fourth, fifth and sixth grades, what a mistake we are making if we build our elementary schools without libraries.

As architects, our office has designed libraries, schools and a children's public library (Fitchburg Youth Library, 1951), but as we became aware of the need for and the lack of elementary school libraries, we realized we knew little of the uses for which such a library should be designed.

A Conference Is Held

Therefore, we invited to the office an educator, a librarian and a mother of elementary grade children. In this we were simulating a good method of preliminary design for any building—bringing together, as far as possible, those who will use the proposed building to express their needs and wants. Once these are defined, assuming persons of vision, it becomes the architect's problem to translate these requirements into a structure that will satisfy today's needs and anticipate tomorrow's. This is the technique we used at Fitchburg. Many discussions, written lists of desired features, preliminary drawings and further discussions preceded the final plans.

In the discussion at our office about elementary school libraries, we posed more questions than we were able to answer, realizing that each school situation will have its peculiarities. As we talked, certain ideas did take form.

First, the school library, elementary or secondary, will not usually be planned to eliminate the public library. In some cases it might be operated as a community library for children, which would change some features of its design. It would have direct access to the street, adjacent toilet facilities and be separable from the rest of the building. There might also be more provision for leisure reading within the library. But most often the school library will be designed solely for school use by school children.

Of prime importance is its placement in the school plant. It should be in the very hub of the school so that children going to and from class will be constantly passing its wide open doors, enchanted by its beauty,

Main reading room of the Fitchburg Youth Library, as seen from the control desk. Two panels of the glass wall at right slide to one side and open area to the garden.





A luminous ceiling of slim-line cold cathode lamps over corrugated plastic provides the lighting for this reading and browsing area for junior high school age youth.

made curious by arresting (and frequently changed) displays. It must be intimately related with the classroom area so that it physically conveys the connection between source material and learning. As a central library it can all but eliminate the classroom need for resource material. A few classroom shelves for collateral or pleasure reading should, of course, be included in classroom design, but their use would be secondary.

The library must be the kind of room, difficult to describe in words, that is foremost a child's room. By its design it can create an atmosphere of interest and excitement in books, lead a child to feel at home in the library, and hence at home with books in warm familiarity.

Its proper size could be defined by various formulas: 25 feet per reader, a seating capacity for one-tenth the student body, etc. However, besides the necessary feeling of spaciousness (and always making provision for future expansion), actual size will be determined by *all* the uses to which the library will be put.

For how many purposes will the room be used? How broad is the function of a school library? At the least, it must provide reference work and collateral reading for the school curriculum, with a "teaser" assortment of fine recreational reading to stimulate the child to search further for informational and pleasure reading at the public library.

Ideally, inasmuch as the librarian is the custodian of all knowledge which man has recorded in one form or another, the library should not be confined to books. It is certainly legitimate in the ideal school library to make provision for the new communications which are today such an important part of a child's life—for instance, he should not only find books on baseball, he should have the opportunity to watch the World Series. Our own feeling is that every possible medium of communication should be available to the widest practical extent, even as far as providing space for Glenn Miller records as well as the fine Landmark series on American history, and a shelf of better comics perhaps adjacent to selected books related to a subject introduced by the comics. To capture and hold the child's interest in books, which are, after all, man's most permanent form of recorded knowledge, an alert teacher or librarian can quickly bridge the gulf between the new communications and literature when both are conveniently at hand in pleasant surroundings.

For many children the school library will be the

only place where they make direct contact with their cultural heritage (not underestimating the superb work being done by so many children's librarians in the public libraries through school visits, stimulating programs and bookmobile trips to playgrounds.)

Use of A-V Materials

While records, films, slides, TV sets and other audio-visual aids ought to be in the charge of the librarian (and proper storage space designed), should any of them be used in the library? Should movable partitions be provided to close off areas for special class groups? We thought partitions were perhaps not necessary, that any stimulus to a child's interest and curiosity is good, and that overhearing a class engaged in searching out an answer to, say, the reason for the eclipse of the sun might be more valuable to the listening outsider than concentration on the job on which he's engaged. On the other hand, we were less positive about the use of other media in the library itself. Primarily the library room ought to be used for recreational and assignment reading and for discussions relating to source material. However, the Fitchburg Youth Library has found that other uses do not require complicated physical separation. For example, children three feet away from a small group listening to records can sit totally absorbed in their own reading.

Although the only permanently closed off area in the library should be the librarian's workroom, it might be desirable to have an adjacent small room for teacher-student or librarian-student conferences, and a separate room for previewing films and slides.

One further idea from our discussion on size: children often find it comfortable to sit on the floor while reading. To provide both a pleasurable and a comfortable atmosphere, the elementary school library ought to have open areas of floor space where children feel free to sit while reading or listening. Space, light, color, easy access, relaxed atmosphere, convenience, flexibility —these are the essentials, and they are the same for public children's libraries as for school libraries.

A library for elementary grade children, whether public or school, must have windows that reach low enough for the child to see outdoors from a sitting position. In the Fitchburg Youth Library a child never has the sense of being shut in. Many of us have unpleasant memories of overpowering stacks of books, musty odors, chinning ourselves on the librarian's desk to charge out a book, high, dusky windows and hushed hisses to silence a childish treble. All these were designed out of the Fitchburg Library. One junior librarian was overheard to say that working there was like being in a doll's house. That is as it should be—children are small.

Light, spaciousness, conveniences for the child, easy access are practically self-evident. Flexibility may not be. Perhaps nothing except the four walls of the library should be permanent installations. Just as movable chairs and tables have replaced set desks in the classroom, so movable bookshelves and easily moved chairs and tables should replace conventional library shelves and heavy furniture—and for very much the same reasons. Not only can the room be frequently and easily rearranged for various functions and groups, but without much effort the library itself can adopt new arrangements, appealing to a child's delight in simple changes. The card catalogue in the Fitchburg Library is a mobile unit and has proved most practical when giving a student instruction in the use of the library. It also allows for room rearrangement, along with the other mobile cases in the building.

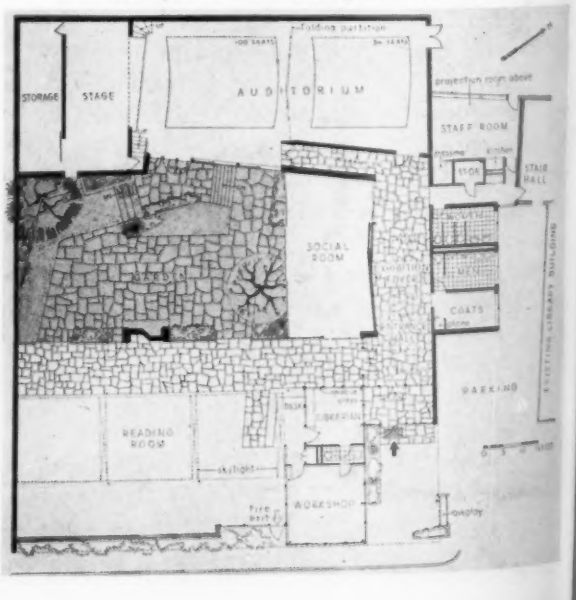
Of course tables and chairs should be lightweight, light in color and in children's sizes. Discussions around a table are always more productive for some reason, and the need for table space is obvious. Slant top tables are especially practical for the youngest children or for newspaper reading. We four—architect, educator, librarian and parent—discussed some pros and cons of comfortable reading chairs, taking into account the limited free time an elementary school curriculum allows for leisure reading, but also remembering that for some children there is no pleasant or proper place at home for reading.

Which brought us to "browsing"—another question posed but not answered. Should a school library provide space for recreational reading? The answer is outside an architect's province, but every encouragement should be made in facility, such as arrangement of quiet corners with best lighting and easy chairs adjacent to recreational reading books.

Color Is Important

Color is very important to children but it must not distract or soon come to be taken for granted. Perhaps

Floor plan of the Fitchburg Youth Library.





Daylight from every direction gives shadowless light in the library. The saw-toothed skylights have lead-coated copper sides.

the most decorative touches should be temporary and primarily used in connection with displays. True, the effective and timely use of display areas is entirely up to the imagination of the librarian, but she should certainly be provided with several eye-catching places for useful displays relating books to current events or studies, or for the display of paintings or objects of pure beauty.

Beauty often came up in our discussion. The library ought to be a place of beauty, setting in the impressionable child's mind a relation between literature, learning and culture. But nothing in the library should carry the sign, tangible or implied, "do not touch." Again the Fitchburg Youth Library has been a case in point. Miss Ruth Hyatt, chief librarian, has observed that the environment has made a tremendous difference in the children's attitude. "I've lived through the extremes in Fitchburg," she said recently. "We had a dark, overcrowded room with everything to make it unattractive in spite of our high standards in book selection. Now I can see the children's delight in the Youth Library where they have space and light and beauty. They don't express it. I doubt if they know what the difference is to them. But it isn't unusual to go in there and see a child spread out on his stomach, another cross-legged on the floor or curled up in one of the big chairs, utterly absorbed in a book. They couldn't do that in a dark, unhappy library. They could do it to some extent, and should have the same kind of atmosphere in a school library."

The mechanical equipment and interior materials selected for the school library have an important bearing on the ultimate environment created. Among the points to consider are the type of lighting and heating; also the type of acoustics required, as well as the materials to be used for the flooring, walls and ceilings, together with their color and texture.

Lighting for the Library

The lighting of a library is perhaps the most important of the technical considerations. Our best source, of course, is natural light; specifically, north light or any other natural light from which direct rays of the sun are excluded. However, natural light must always be supplemented by some form of artificial light. The lighting should be of a recognized lighting intensity. Actually, experiments conducted by Professor Perry Moon at Massachusetts Institute of Technology show that there is no high level intensity maximum but that, with a uniform visual field, the more light you use the better you can see. The ratio of brightness between working surfaces and any other surfaces within the field of vision should also be carefully considered.

It is felt that the brightness of the light source should not exceed three times that of the working surface, and that the working surface should be not more than three times as bright as the floor. Specular reflection is another consideration. In the case of a library, the main concern is with the reflection of paper and ink. We should also refrain from using high gloss surfaces which might cause eye strain. With these criteria in mind, we have found that to date the best possible lighting for a library is a form of luminous ceiling. The amazing thing about a properly designed luminous ceiling is that, while it is furnishing a level of 65 footcandles in a room, the light source remains unobtrusive, almost as if there were none.

Depending on the size of a room, it may be that an overall luminous ceiling should be relieved by other light sources to prevent monotony. Thus, in the Fitch-

Ezra Stoller Photos



A dual, blue-tiled fireplace faces into the garden as well as into the main reading room of the Fitchburg Youth Library. All five units of the library-community center are grouped around the garden.

burg Youth Library we divided the large reading room ceiling into three rectangular bays. The two outside bays are luminous ceilings, the center is provided with three north clerestories by day and indirect incandescent lighting at night. Individual reading lights, as well, are certainly helpful in providing a focus and sparkle to a room after dark. It is our strong feeling that artificial light should give a room a different aspect than it has by day.

Heating and Acoustics

The method of heating a school library will certainly depend on the system chosen for the entire school building. The present trend in school heating seems to be turning to circulated hot water or circulated warm air. Both of these systems can be adapted to provide radiant heating panels in certain parts of the building. Since children like to read on their stomachs or crouched on the floor, the ideal heating system for a library would seem to be a form of radiant heating in the floor.

A third consideration is the acoustical treatment of the room. Here we have the opportunity to create a really quiet atmosphere through the use of sufficient absorptive material in the walls and ceilings. The supporting fins for a luminous ceiling can be made of perforated metal containing an absorptive material such as fibreglas. The sides of monitors, clerestories and the high side walls of bookcases can also be treated acoustically. It is most important to have a resilient type of floor which can be walked on quietly no matter the type of shoe. If possible, from a maintenance point of view, the comfortable chairs might be grouped with a soft carpet. If a hard surface flooring must be used, then certainly the main circulation area into the room and around the control desk should have a rubber mat runner superimposed.

Now for a word about the materials that might be used with the room. The choice of ceiling materials will depend almost entirely on the type of lighting selected. We have in the past specified a corrugated plastic for luminous ceilings. Where incandescent indirect lighting is used any smooth light surface, such as plaster, is satisfactory. Bookcases, where built into the wall, should be of naturally finished wood for a warm appearance plus ease of maintenance. We recommend some form of shelf marking system which will identify the various sections in the library by means of color and number. For instance, at Fitchburg we used book separators made of painted masonite. They were cut on the bevel to project out from the books so that both a color and code numbers could be visible from either side. For flooring, we have found that cork tile, vinyl tile or certain linoleums are good. Linoleum on a radiant slab should probably be applied in tile form and with a special adhesive.

Regarding choice of colors, we feel that most of the excitement can be obtained through the temporary displays and the patchwork quilt of the books themselves and the shelf separators. Generally speaking, other colors should be subdued and fairly light in tone to assist in the lighting system.

The Architect's Viewpoint

From the architect's point of view there is little difference in the approach to designing a children's library in a school or to one for public use. The important element to create is a feeling of interest and excitement for books. It is pretty hard to do with made-over classrooms or in an old-fashioned painted over library room.

In an era of increased subjectivity to mass media, our children need every encouragement to search independently for their conclusions. We are all aware in America of our increasing tendency to see and hear the same movies, the same radio and TV programs, read the same magazines and newspapers. This has the inevitable result of inclining us more and more toward the same judgment and the same tastes. The obvious danger here is that we are losing our individuality, our heritage of the right to be ourselves. In commenting on this in his dedication address at the Fitchburg Youth Library, Archibald MacLeish said ". . . to me, the best and most immediate answer (to this danger) is the book, because it is in a book that you touch, not a generalized, universalized opinion which is standard orthodoxy for the moment, but you touch a man at the most living and rich moment of his life. . . ."



American Library Association

Counterheight shelving is utilized to wall off an area for browsing in the library of the Stratford Junior High School in Maryland. There is built-in seating on one side of the shelving, and ample natural as well as artificial light.

CRITERIA FOR HIGH SCHOOL LIBRARY SPACES AND FACILITIES



by RAYMOND G. ERBES, JR.

Librarian, Reavis High School, Oak Lawn, Illinois; Chairman, Committee on Planning School Library Quarters, American Association of School Librarians, Chicago, Illinois

Mr. Erbes has been librarian of Reavis High School since 1949. He received his B.S. and M.S. degrees from the University of Illinois. Prior to his present position Mr. Erbes served with other school systems of Illinois as principal, teacher and librarian. He was with the U.S. Navy for two years as a member of the Public Information Department.

EARLY in 1953 a committee on planning school library quarters was organized by the American Association of School Librarians to help solve the many and varied problems met in providing adequate and pleasant school library quarters. Besides supplying information on school libraries the committee began "Operation Collection"—a project which consists of compiling lists of new or newly remodeled school libraries in each state.

Questionnaires were filled out by librarians to evaluate their new quarters. Pictures, floor plans and sketches were collected and these, together with the evaluations, are housed in the library of the American Library Association (50 East Huron Street, Chicago 11, Illinois) and may be taken out on loan by addressing the headquarters librarian there. The results of these questionnaires and the opinions of the librarians concerned are considered here.

In locating the school library it is well to remember that it serves every department in the school and it is desirable to have it as centrally placed as possible. The location, preferably on the first floor, should be away from the noisier areas of the school, such as the shops and music department. However, the location of the library will always depend upon the individual school which it serves.

The possibility of future expansion must be considered when new school libraries are planned. It may be a good idea to plan the library with classrooms on at least one side, so that these may be broken into for library expansion if the need arises.

The consensus among high school librarians is that

the school library will best serve its purposes if it is not combined with a study hall. In schools with enrollments over 250 it is desirable to have the study halls adjacent to but not in the library.

It is well to remember aesthetic as well as utilitarian values in planning a school library. Of first importance is the amount of space. About 25 square feet should be allowed per pupil. A maximum of 65 to 70 users can be accommodated in a reading area under the supervision of one librarian. If more room is needed, in larger schools for example, more than one reading center may be necessary.

The Planning Details

Lighting: Just as in the classroom, there must be the right amount and quality of natural and artificial light in the school library. Glare should be eliminated or controlled. As much wall space as possible must be saved for shelving, so it is recommended that windows be as near the ceiling as possible.

Acoustics: The controlling of noise is important. The location of the library in the building has as much to do with the degree of sound as do the materials selected for the floor and ceiling. Ceilings should be acoustically treated, and the flooring finished with a material that tends to keep surface noises to a minimum. Rubber, asphalt and cork tiles have been used successfully for this purpose.

Color: Color is of great consequence in the library. Colors and patterns should be in harmony with the furnishings. Soft pastels are recommended for the walls, and white for the ceiling. Draperies often are used as a decoration and to give an air of informality. Care must be taken, however, not to close out too much of the natural light.

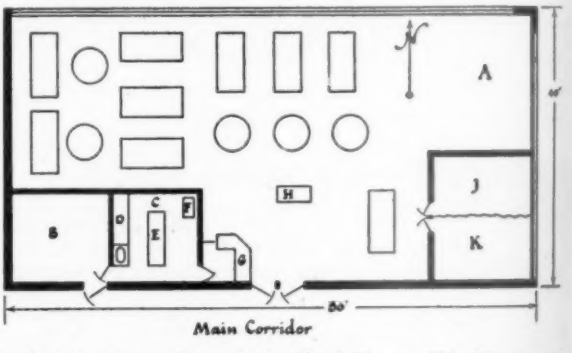
Shelving: Shelving should accommodate from 10 to 20 books per pupil. The American Association of School Librarians recommends the following dimensions:

Length of shelf between uprights	**3 feet**
Depth of shelves	
Standard	**8 to 10 inches**
Magazine storage	**12 to 14 inches**
Thickness of shelves	**7/8 to 13/16 inches**
Height of cases	
Junior high schools	**6 feet**
Senior high schools	**6 to 7 feet**
Work and storage areas	**7 to 8 feet**
Counter height	
Units	**approximately 40 inches**
Base	**4 to 8 inches**
Cornice	**2 to 3 inches**

There are approximately eight books to one foot of shelf space. Space between shelves should be about 10 inches. All shelving must be adjustable to fit the various sizes of books. It is also desirable to have the lower of the bottom two shelves tilted slightly upward for easier reading of titles. Wall areas beneath glass partitions or windows may be used for shelving if there is not too much glare.

Counter-height floor shelving can be used to wall off certain areas in the main reading room. These are usually double faced. Counter-height shelving has been found to be very useful in reference sections, where it is often necessary for students to rest heavy volumes while consulting them. Magazines are best housed in heavy plastic covers on slanted shelves with a horizontal shelf directly beneath for back issues of the periodicals.

Filing Cases: All metal filing cases are needed to house many materials of the library, such as the vertical file, picture file, book jacket file, occupational file and college catalog and information file. These materials supplement books and, in many cases, are more recent than materials in book form. They must be accessible at all times to students if the library is to function as a true materials center and as an aid in the guidance and



Good basic pattern for a high school library. This library seats 74 in the main reading room. The areas are identified as follows: A. browsing area, B. storage, C. office-workroom, D. sink and counter, E. table, F. librarian's desk, G. circulation desk, H. card catalog, J. conference room, K. conference. There is a folding partition between J and K. The north and east sides of the library have shelving 6 feet, 7 inches high with windows above.

educational program. The small high school may be able to get along with two or three file cases, but larger schools will need at least four file cases.

Dictionaries: The atlas, unabridged dictionary and large reference books are best housed in an atlas and dictionary stand. This stand will enhance the beauty of the room if it is of the same style as the other furnishings. A revolving table dictionary holder may be preferred. Still another way is to place the unabridged dictionary on a small table mounted with rubber wheels. This may be wheeled to the tables by students as it is used.

Two or more footstools also are needed for use at the upper and lower shelves. These should match the other furnishings.

Card Catalog: The catalog card case is most important since it is the index to all books in the

library. It is usually wise to select a card catalog case which has a minimum of 10 drawers; and preferably a sectional cabinet so that more sections may be added as the collection grows. A table base can be used for the catalog.

Some schools have found built-in catalogs very satisfactory. In these the card catalog is sunk into the wall but extends out far enough to give some writing surface for the user.

Furniture: When selecting furniture for the main reading room consider comfort and appearance as well as utilitarian values. A mixture of round and oblong tables will lend a note of informality and make different arrangements possible. Tables should not be crowded together; a minimum of four feet should be allowed between tables and between tables and shelving. Tables should not seat more than six pupils, to make supervision easier. The chairs and tables of varying heights will be suitable to the age of the users. Rectangular library tables may vary in length from 5 feet to 6 feet 6 inches, and in width from 30 to 36 inches.

Junior high library tables are approximately 27 inches high, while senior high library tables should be 29 to 30 inches high. Round tables should be from 4 to 5 feet in diameter. It follows that the height of chairs will vary from 14 to 18 inches, depending on the table height.

A dash of color may be added by the purchase of chairs with colored leather or plastic backs. In general, the trend is toward light colored woods with as natural a finish as possible.

A-V Storage and Previewing

The library should have an area or room where audio-visual materials are kept and from which they may be withdrawn. A conference room can serve as a listening room for recordings, or a few small listening booths may be installed. For viewing films a darkened, soundproofed room is necessary. Such a room, which could be next to the library, would be used for the previewing of films by faculty members and small groups of students. It should be equipped with a table or bench for the projector, an additional table, chairs, electrical outlets and a projection screen. If this room also houses the audio-visual materials, special record cabinets, shelving and filing cabinets will be needed.

General Space Arrangements

In planning the high school library it is well to remember that a vital grouping should be observed. First, it is preferable to have just one main entrance and exit point to facilitate traffic control and supervision. Second, the charging desk should be immediately inside the entrance of the library. Third, the librarian's office or office-workroom should be near the charging desk.



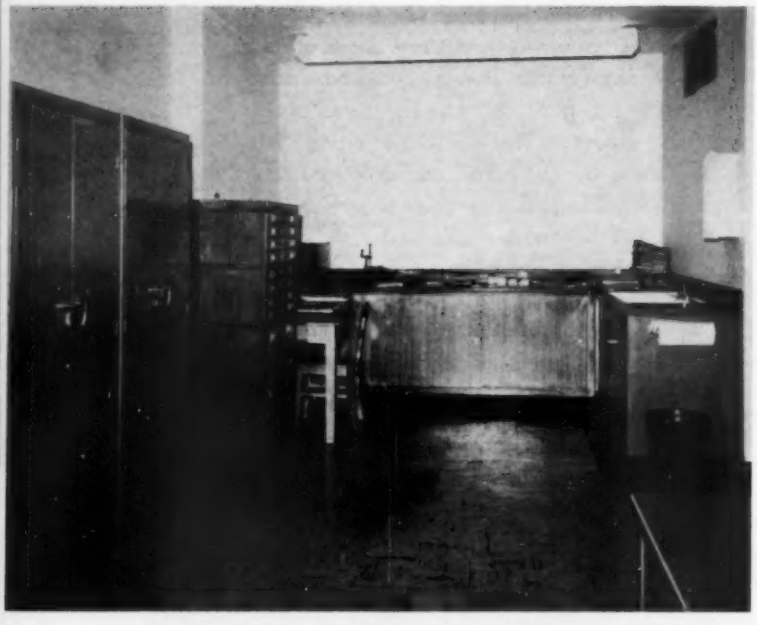
Recently remodeled library of the Mendota, Illinois, Township High School. From the librarian's office, directly behind the charging desk, the entire library can be seen.

Mahlach

The entire library plan is dominated by the position of the librarian's office. It is of utmost importance that this office be placed so that most of the library can be supervised from the librarian's desk. Glass partitions above counter-height shelving make ideal walls for a librarian's office.

The well equipped library office will have a large desk and chair located advantageously for viewing the library, a typewriter, filing cases, a table, chairs and shelving for the librarian's reference books. The furnishings of this room will depend entirely on whether it is to be used as a librarian's office or as an office-workroom. It is here that a librarian will confer with students and help them with materials and professional guidance. Here also is an excellent place for conferences with other faculty members concerning materials for future units of work. The card catalog should be located near the librarian's office.

The library workroom where books and other ma-



One end of the workroom in the Central High School library, Louisville, Kentucky. The excellent lighting combines with the cabinets, cases and work table to make this a pleasant work space. There is also a sink for added convenience.

terials are prepared for circulation, will probably be combined with the librarian's office in smaller schools. Sometimes the workroom and storage areas are combined. If this combination is made, the area should be at least 250 square feet.

The workroom must be large and well lighted and ventilated, for it is here that student librarians will be busy with the many tasks of preparing materials. Shelving should cover nearly all the wall space, except when the workroom and office are combined. Shelving may well be 8 feet high in the workroom and 12 to 14 inches deep. A small stepladder or stool will be needed.

Numerous cabinets will provide ample storage space for materials other than books. Such items as display posters, display models, boxes of book cards and pockets, paste jars, cans of shellac and many other items that are unattractive when lined up on shelves can be neatly kept out of sight in cabinets. Other articles that must be protected from dust should also be stored in cabinets. When there is no separate audio-visual room, built-in cabinets make excellent places for storing filmstrips and phonograph records.

One big "must" in planning a library workroom is a sink with running water. The sink can be part of a long work counter covered with laminated plastic or some other durable finish. Cabinets below it, with toe space, will prove to be of value. Another "must" in the workroom is the installation of numerous electrical outlets.

A large worktable with chairs, a typewriter, a typewriter table and chair and a librarian's catalog card case with at least a six-drawer unit and a table base (for schools with an enrollment of less than 500) are recommended. If the workroom is also a storeroom, two or three vertical file cases can be included for pamphlets, pictures and other materials.

The browsing area is an investment in space that pays big dividends in persuading the individual who isn't quite sure about it to spend some time reading. This area may be an end or corner of the main reading room—perhaps sectioned off with counter-height shelving. Another plan is to use a glass partitioned room for a browsing area. Here the student is placed in an informal situation as near to an ideal home environment as possible.

Conference Rooms

Conference rooms are a necessity for today's library program. In a small school, where space and money are limited, perhaps one all-purpose room will double as a conference room. However, if a vigorous library program is to be carried out in the school a small room, set apart for small groups or classes busily engaged in projects and research, is necessary. Here, informal meetings will be held that would be distracting to those in the main reading area. It is often necessary to have a room like this where material can be discussed and examined and where individual guidance can be given by the librarian.

Only the librarian with a limited imagination will not be able to put the conference room to many uses. Various materials will be housed in such a room. Some high schools keep all of their college catalogs, vocational books, pamphlets and so forth in one conference room and make it a vocational corner. Of course, the room will also be used for many other educational activities throughout the school year.

Although one conference room may be enough for small school libraries, two or more will be necessary in larger high schools. Tables, chairs and standard shelving should be provided in each room. A folding partition can be placed between two conference rooms so that one large room may be formed when needed.

A conference room can be reserved as a faculty room, with professional books and periodicals kept here. Since the purpose of the school library is to serve both faculty and students, a good collection of the latest professional information should be kept in a convenient location. A professional room such as this will prove ideal for faculty committee meetings, which may require information the librarian can provide.

Display Areas Needed

Book jackets and posters usually arouse a landslide of requests for the books involved. It is surprising how much interest is created by a colorful book cover or circular, and the librarian must have a place to exhibit them. Often table-height glass-topped display cases are useful for this purpose. Cork bulletin boards,

placed at strategic points in the library, are less expensive and just as effective. If possible, it is most desirable to have a glassed-in display case located just outside the library to call attention to exhibits of newly arrived materials and books of interest.

The Library Classroom

Library instruction is especially effective when a class may be brought directly to the library and placed in the real situation. In some school libraries an extra large conference room is the place where library skills are taught.

Near one end of the library in Reavis High School, Oak Lawn, Illinois, is a large wooden partition which may be opened or closed to create a library instruction room. The room, equipped with chalkboard, display board and other classroom necessities, makes an excellent place for teaching library skills and materials. The library instruction room may also double as an area in which professional materials are housed or, if it can be sufficiently darkened, as an audio-visual room.

How to use the library is usually taught as a unit in English or social studies classes. Nearly every student takes one or the other of these subjects, so it is relatively easy to make sure that all have the opportunity to learn library skills. This does not rule out the possibility of other classes visiting the library to work out problems involving use of library tools. A library classroom which can be partitioned off from the main reading area will be most useful in such cases.

In many of our more populated cities where schools and libraries are larger by necessity, librarians are planning libraries with three or four reading areas. These areas may house certain books by types.

Charging Desks for the Library

The charging desk should be near the main entrance. The size and shape will vary, depending on space available and the color and styling of other furnishings. At the present time rectangular, L-shaped or U-shaped charging desks are available from library furniture dealers. Many of these may be made to order to meet a school's particular needs.

A low charging desk should be considered for use in elementary schools. Toe room at the bottom of the charging desks facilitates use by the students. The circulation desk may have a return book slot, although some libraries have outside slots for the return of books.

Behind the charging desk, or in it if the desk is a large one, will be additional shelving for books placed on reserve. A comfortable chair, of appropriate height for the desk, should be behind the charging desk. It will be convenient to have a book truck close by for books to be returned to the shelves.

By closing a partition at the far end of the library of the Reavis High School in Oak Lawn, Illinois, a library classroom is formed. The partition also serves as additional display space, each panel contains corkboard sections.



Library Is a Materials Center

We have average students in our schools as well as superior students and slow learners, and the educational needs of all must be fulfilled. The answer lies in providing a wide range of instructional materials. A centralized collection of these materials should be available where the teacher or student may come for pictures, filmstrips, slides, recordings and other audio-visual materials, as well as books, pamphlets, magazines and other printed media. The Committee on Planning School Library Quarters of the American Association of School Librarians has often been asked why it advocates a centralized collection of materials rather than a dispersed or self-contained collection—often misnamed a "classroom library." It is felt that the word *library* implies services—services which only a librarian can provide in a particular atmosphere with all the necessary tools. Classroom libraries are more correctly called classroom collections and we believe these never can replace the centralized collection for the following reasons:

1. Financially it is almost impossible to equip each classroom with all the books and materials the youngsters will use during the year.

2. Because of space limitations, only the materials essential for each grade level would make up the classroom collection. A greater range of reading materials is available when all resources are pooled.

3. The centralized library offers many learning experiences in employing materials and looking up facts through use of library tools like the card catalog and readers' guides.

4. In using the centralized collection the student has the help and guidance of someone especially trained in the selection and use of materials—the skilled librarian.

5. Teachers are relieved of technical details in handling materials and have more time for teaching.

6. Whether students go on to higher formal educa-

tion or whether they must seek employment and continue with a self-education program, they will need to know how to use our public and other libraries. If they have developed the library habit in the centralized school library, using the wealth of materials there, they will know how to use other libraries, and they will not be at a loss when confronted with the problem of seeking facts.

Although our library planning committee advocates the centralized collection, this does not rule out the need for having in each classroom a unit of at least six shelves for housing library materials. For various projects the class may wish to withdraw a number of books on a particular subject and temporarily keep them in the classroom. It is also recommended that each classroom be equipped to use audio-visual materials, since these materials should be used primarily in the classroom.

The School Librarian's Place

No comment on school library quarters would be complete without a word about the librarian who serves as the coordinating and administrative influence. The school librarian should be professionally trained and experienced in education as well as in librarianship. He is the resource person at faculty and administrative planning meetings. He should possess the personal characteristics of an outstanding school teacher, one who loves books and children.

The librarian must know the curriculum and participate in its planning. With a knowledge of what takes place in the classrooms and by knowing the teachers, he will be ever ready to help with their materials problems. When a new unit of study is begun, the teacher should be able to call upon the librarian for assistance. The American Association of School Librarians' standards call for one full-time librarian for school enrollments between 200 and 500 pupils. Another librarian is needed for each additional 500 or major fraction thereof.

It is interesting to note that more and more of our colleges of education are including library science courses as part of the preparation of a well qualified teacher. The librarian, a teacher in every sense of the word, is accorded the same professional status as other faculty members regarding training, certification and salary.

The librarian will need some clerical help to relieve him from routine technical details and allow him time for professional duties, including working with boys, girls and teachers in the uses of library materials. It is recommended that one full-time clerical assistant be employed for each 1,000 students and one for each additional 1,000 enrolled.

In addition to professional clerical assistants, the library can be staffed with student assistants. Student library helpers aid greatly in daily routines and participate in a training program where the personal growth of the individual commands priority.

School Library or Public Library

In some communities the school library is also the public library. This practice is not too common, and does not prove too satisfactory. On the basis of limited information it would be presumptuous to condemn or praise this method of distribution. Where a school library must also serve as the public library it obviously should be readily accessible, preferably located on the first floor of the school with an outside entrance. Many difficult problems do arise in this dual situation, especially with regard to book selection, librarian's hours, equipment and so forth.

It never should be construed, however, that the school library should replace or take over the public library. There is a very definite need for both, and one should complement, not replace, the other.

Outstanding Library Quarters

Outstanding library quarters are never to be regarded as an end in themselves. A complete, well administered school library serves to improve and enrich the school program by providing a wealth of material in an atmosphere which creates a love for reading. Students are taught how to locate and use materials.

Because the library serves every other department or branch of the school, it should be remembered most generously when the school budget is set up. After the library has been established, a minimum budget of $2.50 per pupil should be allowed.

Since the library is an integral part of the school, all expenses entailed in building, equipping and operating the school library are responsibilities of the school board. It should not be necessary to conduct tag days, P.T.A. carnivals and the like to raise funds to purchase school library books.

In conclusion, it is well to point out that in the school library field, as in other worth-while endeavors, there are differences of opinion. We must remember that the perfect school library has yet to be built and the perfect library program has yet to be set up. Many schools may never be able to carry out some of the recommendations made here, but they are listed as criteria to strive for—standards which can make tomorrow's school libraries true fountains of knowledge.



Three girls work together as a family to prepare a full course meal as part of their homemaking education study.

NEEDED FACILITIES FOR A MODERN HOMEMAKING PROGRAM



by RUTH C. COWLES

Consultant, Home Economics Education, Connecticut State Department of Education, Hartford

Ruth C. Cowles started her home economics career early, doing part-time teaching even before graduation from high school. She majored in home economics and received a B.S. degree from Middlebury College. After teaching and administrative positions in Massachusetts and Rhode Island, Miss Cowles returned to Connecticut as assistant state supervisor in 1947. She became a consultant in 1949. Miss Cowles also has an Ed.M. degree from Boston University.

THE first look into a homemaking department today tells a story about the kind of instruction being given there, and excites an interest to learn more about home and family activities. The homemaking department has become a center of continuous activities as it serves the total school program. It is the "home center" of the school and administrators are learning to make use of its charm and hospitality to welcome new students, to entertain the school board and to widen the interest in adult homemaking education. Home economics teachers value the many opportunities for students to practice hospitality. They realize that the facilities available today can serve all the many school groups. Academic teachers are interested in the homemaking program because the doors have become unlocked, and there is effective space for the Latin department's Roman Banquet, the Honor's Day tea or the football hero's supper.

To serve as an educational laboratory and as a hospitality center the department is often located near the front door, easily available from the auditorium or near the library, little theatre or special conference rooms. Some homemaking departments in the larger schools occupy a separate wing, with access to a play area for preschool children and even have a separate apartment or house with a home type entrance. Because the department serves the entire school, it is no longer considered necessary to locate the rooms with other vocational offerings such as industrial arts or the cafeteria. With today's ventilation methods a basement or top floor location has become unnecessary. In short, the homemaking department has come into its own as the "home center" of the school.

Demands of the Program

The modern homemaking program, giving instruction in many areas of homemaking, demands attractive, home-like and flexible facilities. Its first function is to serve as a laboratory for home and family life instruction for all boys and girls, and for the specialized field



This two-teacher homemaking department has a variety of all-purpose facilities. Different make stoves permit a greater range of experience for the students.



An all-purpose room is essential for seventh and eighth grade exploratory work in homemaking. The unit may include a foods and clothing area, with plenty of shelf space for the department library.

of homemaking for all girls. To accomplish this purpose and to serve other school groups, one room may be arranged to accommodate the program in a small school, while a series of three to six rooms may be needed to serve a larger school. Flexible space, home-like decorations, movable furniture and varied storage units will allow a room to be changed for instruction in home management, consumer economics, health and home nursing, the house and its furnishings, personal and family relationships, child care and development, foods and nutrition, clothing and textiles.

Whether the department consists of one room or many, there are five essentials that can be recommended, as follows:

1. Have at least one all-purpose or multiple purpose laboratory in every department.
2. Allow freedom and flexibility in space arrangements.
3. Provide adequate and versatile storage.
4. Plan for home-like decorations, colorful backgrounds, a center of interest and a teacher conference area in order to obtain the "home center" atmosphere.
5. Permit adaptation for an adult homemaking center that may offer opportunity for out-of-school classes.

Curriculum Needs

The number of rooms included in the department will differ according to the expected pupil enrollment in the school, the curriculum offered, the number of teachers to be employed and the plan for school community service. The instruction considered essential by the community will lead to a choice of rooms to be included. State supervisors of home economics education, personnel in home economics departments in colleges and universities and other qualified consultants are most willing to assist school personnel in planning curriculum and making choices for space and equipment. There



A simply arranged living area may occupy one corner of the homemaking unit space.

are also many commercial equipment companies that work closely with state supervisors and other home economists to give assistance for choices of rooms, arrangements of equipment within each laboratory and special features for teaching an all-over homemaking program. A description of a modern homemaking program cannot be given here, but it is important for each community to adopt the program that best fits its needs.

The all-purpose room is an important first requirement because of the introductory work given at the seventh, eighth or ninth grade level. This type of laboratory gives an excellent opportunity to change areas, vary experiences and adapt space. The teacher is free to bring about pupil-teacher planning and an even integration of the various areas of homemaking, because all her facilities are constantly available and space may be changed easily to suit the activities. Larger departments may move students through laboratories for foods, clothing, living, child care, family relationships or a work room, but the instructor who finds teaching opportunities within the confines of her own laboratory is fortunate.

The two teacher department usually includes three rooms—foods, clothing and a living area between. It was hoped that the placement of the living area between the other two rooms would give each teacher all-purpose facilities. Some schools have used folding doors to make the living area a part of the foods laboratory or the clothing laboratory. Preplanning is essential here in order to create an atmosphere and working conditions that are improved and functional beyond yesterday's cooking and sewing rooms. Teachers need to consider which units of homemaking integrate successfully with foods and which units will be better taught in the clothing laboratory. Then they must set out to change the atmosphere and arrangement of their rooms in much the same way as they would an all-purpose room.

Furniture for the living area should be in keeping with the community standards.



When a school can have several rooms in the homemaking department, an all-purpose room, a clothing room and a foods room may start the collection, but what is the choice for rooms four, five and six? What part does the apartment or the attached house play? The home economics staff and what they teach lead the way here. The family relationship room has been found to be very functional. With an outside door leading directly to a play area it becomes a play school where teen-agers have an opportunity to observe and work with small children. When the play school isn't in session, two or three beds appear and instruction is given in home nursing.



An arrangement like this can create an attractive entrance to the department.

A classroom-size living area with three walls of storage has the same efficiency. A classroom given over to a living area can be divided and given versatility, as in the family relationship room. Some suggested layouts for rooms have shown areas divided by grooming bars, laundry units, fitting rooms or small apartment rooms. This takes away flexibility and therefore needs to be considered carefully. Some schools have used movable partitions successfully. Modern homes are setting off areas of the house with furniture. Such a practice in a homemaking department allows freedom for pupils to make changes, try out different arrangements and is in general far more efficient.



The living area of the home-making department is easily adaptable as a social meeting place where boys and girls may enjoy each other's company, hold small work conferences, etc.



Learning first hand the complex nature of children is an objective of the child care class.



Home nursing is taught in an informal atmosphere. The furniture may be arranged for small or large group units.

Building Codes and Floor Space

School buildings generally take a uniform plan for sizes of most rooms. Therefore, it is necessary to define space for homemaking early in the building plans. The homemaking rooms will have to conform with the uniform plan unless they are to be located in a separate wing. If three walls of the room will be fitted with storage, what happens to floor space? Floor space on an architect's drawing is difficult to visualize. A visit to a variety of new schools may help. The 30-foot by 30-foot

Proper care of equipment in use encourages good habits for all.



average classroom will fail to function efficiently for a homemaking classroom. On the other hand, space allotments may become too long and narrow if two or more classrooms are thrown together and the dimensions become 60 feet by 30 feet or 90 feet by 30 feet.

Most states have building codes that will help home economics teachers estimate space requirements for different activities. Equipment companies are most helpful, and will prepare suggested layouts for allotted space. The essential is to keep space flexible. Unit kitchens are never too flexible but a plan for a maximum of three to five unit kitchens will conserve some

The living area provides a quiet corner where students may study.



space for flexibility even in a foods laboratory. It is just as unwise to have too great a floor space as too limited a one. We do not wish to point up extravagance. We wish to emphasize utility of space.

Community Acceptance Important

Community acceptance of the type of equipment purchased is of greatest importance. Communities planning new schools can make interesting surveys to discover data regarding equipment used in the homes of the pupils. The question of whether to buy gas or electric ranges, the luxury of washing machines, dryers and ironers and many other questions may be settled in this way. Building budgets do not always include the purchase of small equipment and materials of instruction. Many times some of these must be moved in from the old school. We need not be extravagant but must hold to the principle of meeting the real needs of pupils and serving the total school program. The homemaking department no longer can be considered extravagant if it is functioning to meet the needs of the entire school as a "home center."

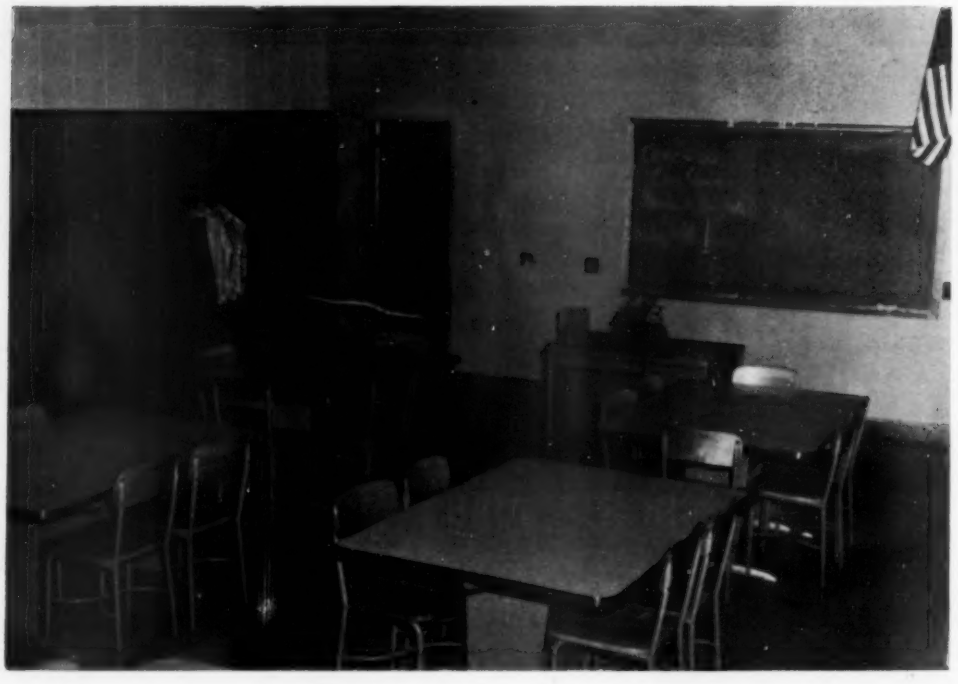
The selection of furnishings, dishes and many other articles should be an educational experience for the students. They will appreciate the opportunity to play a part in planning for the new school. They will give



Sewing class students learn the art of reupholstering furniture.

great care to equipment so selected and will see that other pupils respect the furnishings. They also will guide selections so that furnishings are in keeping with those found in their own homes.

In selecting small foods equipment many ideas for a variety of classroom experiences may be incorporated. Foods equipment selected at different price levels has been found to be practical for the high school. A plan to provide a different type of kitchen ware such as pyrex, agate and aluminum, each in a different kitchen, is also practical. It has been interesting in some communities to equip one unit kitchen in each department attrac-



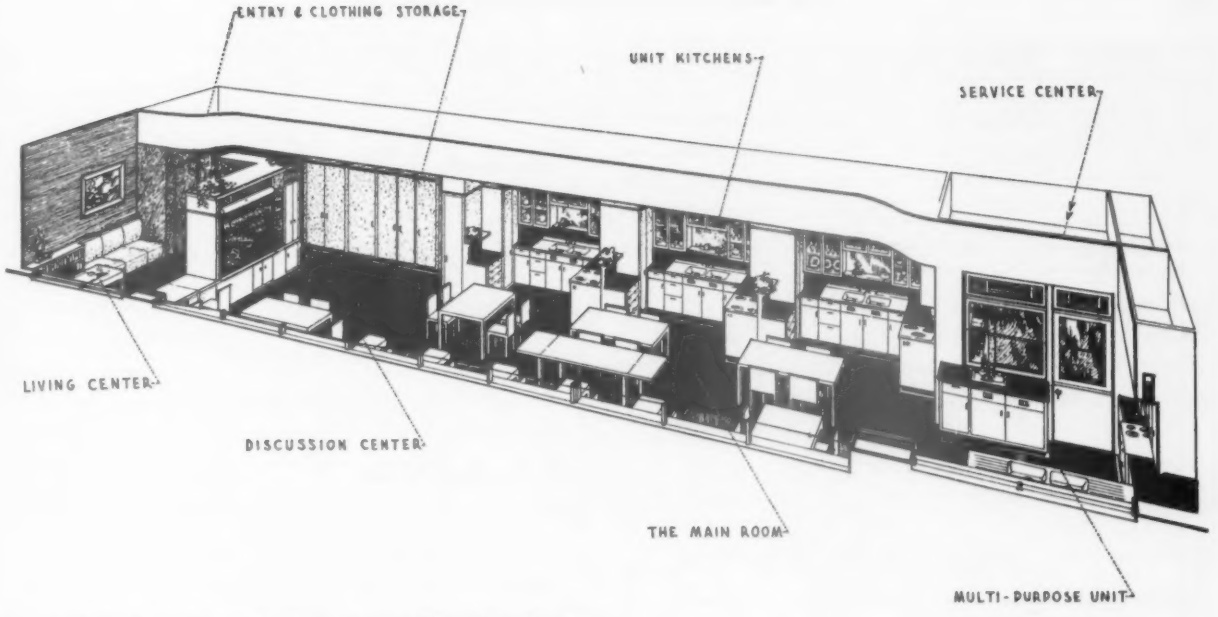
Wide all purpose tables are adaptable for a variety of homemaking activities.

tively and efficiently with purchases from the five and ten cent store. While the luxury unit and those at price levels in between have been equally functional, it is wise for a community to provide only the equipment which may be purchased in its own stores. If students find that the local water supply discolors pyrex or that plastic dishes offer some problems too, they have experienced a worthy basis upon which to make their own choices.

Management for Function

Let's not have an expensive, beautifully equipped homemaking department which has no budget to function as an educational center. Storage cabinets for home nursing and child care equipment, the roll-away bed, magazines, books, charts and filing cases are included in the department to give teachers an opportunity to have the materials of instruction necessary to teach all areas of homemaking. Such storage facilities might not have been provided before, but they are most essential to a modern homemaking program for consumer and management studies. Inexpensive home-like touches, plants, ceramics, draperies and living room furnishings should also be provided. It is not enough to own all this equipment, the "home center" must come to life by permitting the students to have a part in the opening of the department each year, by changing furnishings and considering ways of preserving what they have, by taking part in the care and management of the rooms and by considering proper steps for closing the department for vacation periods.

We can look into the modern homemaking department of today and see what kind of instruction is given. The school finds uses for the homemaking department as a "home center" only if it radiates hospitality and gracious cooperation like that "home of your own!"



A perspective view of a one-room homemaking department. (Adapted from the University of Illinois Bulletin, "Principles of Planning the Homemaking Department.")

HOMEMAKING SPACES FOR NEW SCHOOL BUILDINGS



by STACEY KRASNECKI

Head of the Homemaking Department, Senior High School, Great Neck, New York

Miss Krasnecki has a B.S. degree from the State Teachers College, Framingham, Massachusetts, and an M.A. from Teachers College, Columbia University. She has taught homemaking in Amherst, Massachusetts, and Ossining, New York, before her position at Great Neck. Miss Krasnecki has also taught adult classes in foods, nutrition, clothing and interior decoration.

OUR major objective in teaching homemaking can be stated simply—to give young boys and girls a better working knowledge of how to live in a family and how families may better live with one another. Since this goal in itself is not static, it becomes increasingly difficult to set up an ideal physical environment in which the desired learning and growth can take place.

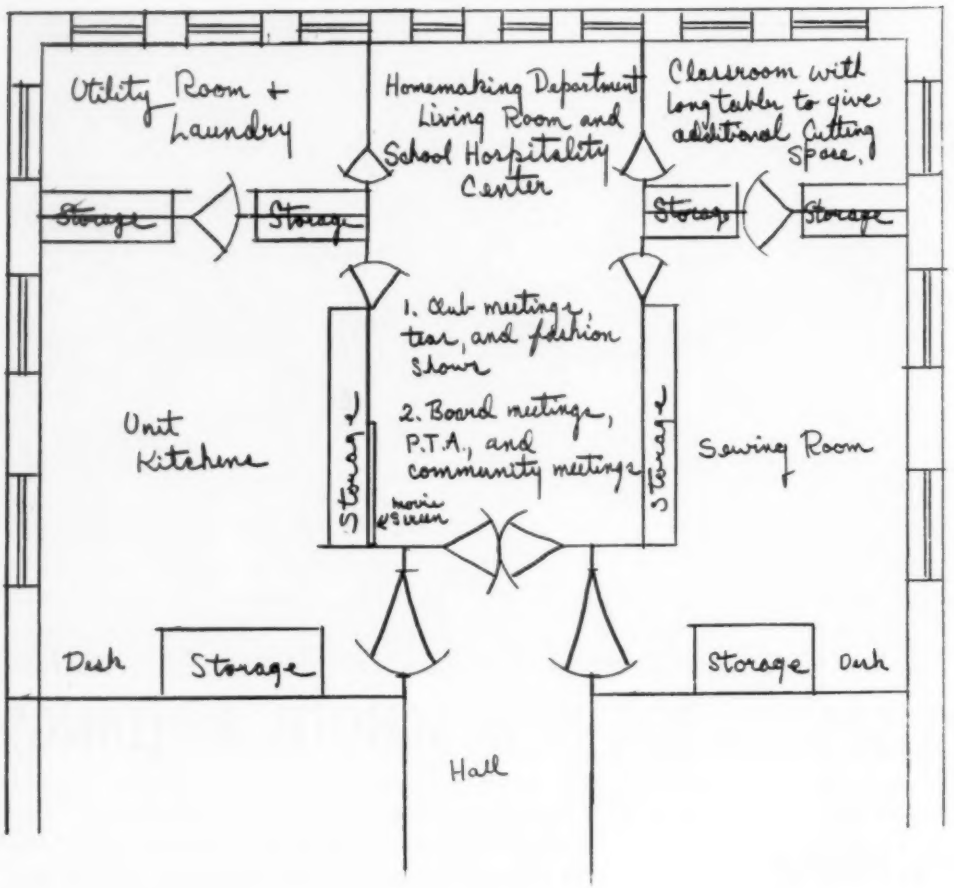
In the home situation a certain amount of space is needed for the activities of daily living, and a certain amount of equipment is necessary to facilitate the tasks involved. Should the amount and kind of space needed for each family of the same size be approximately the same? We tend to look with apprehension upon whole communities or large sections of communities which are made up of houses that are alike, lest the inhabitants become too urban and inbred. Can individual family differences find expression in homes built alike?

Does it not necessarily follow that the spaces for teaching homemaking should vary with each locality? In planning spaces for teaching homemaking we need to provide an educational climate in which certain basic needs are met, so that young people will be better equipped to cope with the society in which they live. We must also lend proper ego support for the teacher if she is to be an effective individual.

The Educational Climate

To provide an *educational climate* for meeting basic needs through homemaking education for boys and girls on the junior and senior high school level, these overall objectives are necessary:

1. Encourage improved personal and family living.
2. Help students to accept their physical selves, and point out ways to improve personal appearance.



This compact, easy to supervise department may be shared by two or three teachers.

3. Help students build wholesome attitudes toward themselves.
4. Provide experiences in all phases of homemaking.
5. Set a standard for developing homes in the community.
6. Strengthen the satisfying and effective family relationships which are already present.
7. Plan, by cooperative effort, a curriculum which meets the needs and interests of pupils.
8. Develop a "family-centered" curriculum.
9. Assist individuals to make satisfying adjustments in life situations.
10. Help to achieve personal independence.
11. Provide activities and learning for achieving new and mature relations with age mates of both sexes and with adults.
12. Develop in students a positive attitude toward marriage and family life.
13. Develop intellectual skills and concepts necessary for competent family living.
14. Provide opportunities for growth in managerial ability and competence in the skills of homemaking.
15. Stimulate understanding attitudes toward different religious and cultural aspects of family life in the community.
16. Help individuals acquire a set of values and an ethical system as a guide to behavior in personal and family living.

To realize these objectives, adequate areas for participation, placing of equipment and storage of other equipment and materials should be incorporated into homemaking spaces for these activities:

1. Group discussions for formulating plans—groups should not be too close together.
2. Class discussion, demonstration and evaluation. Movable chairs with tablet arms for writing may be used in some instances, tables with chairs in others. For informal seating arrangements the living room may be used.
3. Viewing films and slides.
4. Informal gatherings of students and adults.
5. Arrangement of utensils and equipment in a kitchen.
6. Preservation and storage of food.
7. Preparation of food.
8. Serving of food.
9. Arrangement of furniture in a room.
10. Furniture refinishing and painting.
11. Construction of draperies, slip covers, etc.
12. Household repairs.
13. Arrangement of flowers.
14. Cleaning rooms and caring for equipment.

15. Laundering of household linens and clothes.
16. Spot and stain removal of clothes, household fabrics and other materials.
17. Home care of the sick.
18. Care of beds and bed-making.
19. Care of children in the home, including infant care.
20. Construction of children's toys.
21. Selecting clothing, including fabric, style, color and construction.
22. Grooming.
23. Constructing garments using a commercial pattern.
24. Caring for clothes—pressing, repairing and storing.

Ego Support for the Teacher

Proper *ego support* for the teacher can be effected in the following ways:

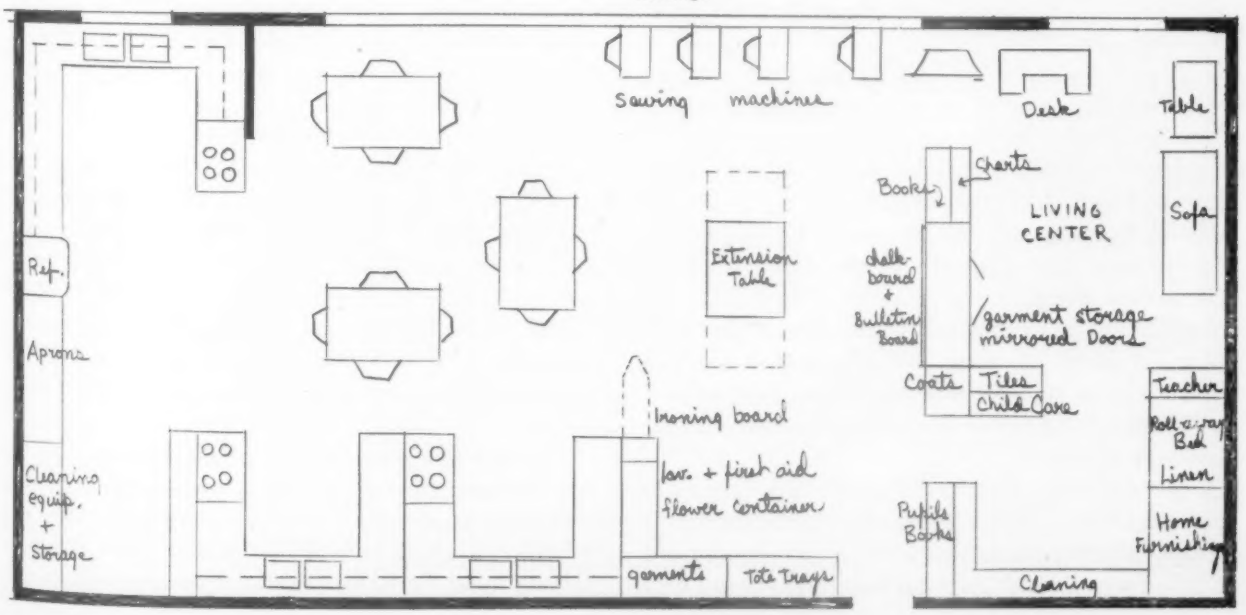
1. The areas which one teacher will supervise should be adjacent. The living and dining area should not be across the hall from the foods area.
2. The walking distance from one area of supervision to another should be reduced to a minimum.
3. Shared facilities, such as the laundry, workshop and living room, should be located so that each teacher has easy access to them. An across-the-hall arrangement would be more efficient than having all the rooms in a line.
4. Rooms should be compact, without sacrificing space for chalkboard, bulletin boards, space for storage and floor space, to enable the class to be together for a discussion or demonstration.
5. There should be storage for such teaching materials as wall charts, books, booklets, displays and current articles in files.
6. The rooms should be wide enough so that there is no congestion of traffic between unit kitchens and sewing equipment. A width of 28 feet seems to be more ideal than 24 feet for a homemaking room.
7. Each class area should be a separate unit so that noises from another class group may be eliminated. Folding doors are not soundproof enough to make an adequate division if two classes are involved.
8. Proper facilities should be provided to teach broad concepts of homemaking education.

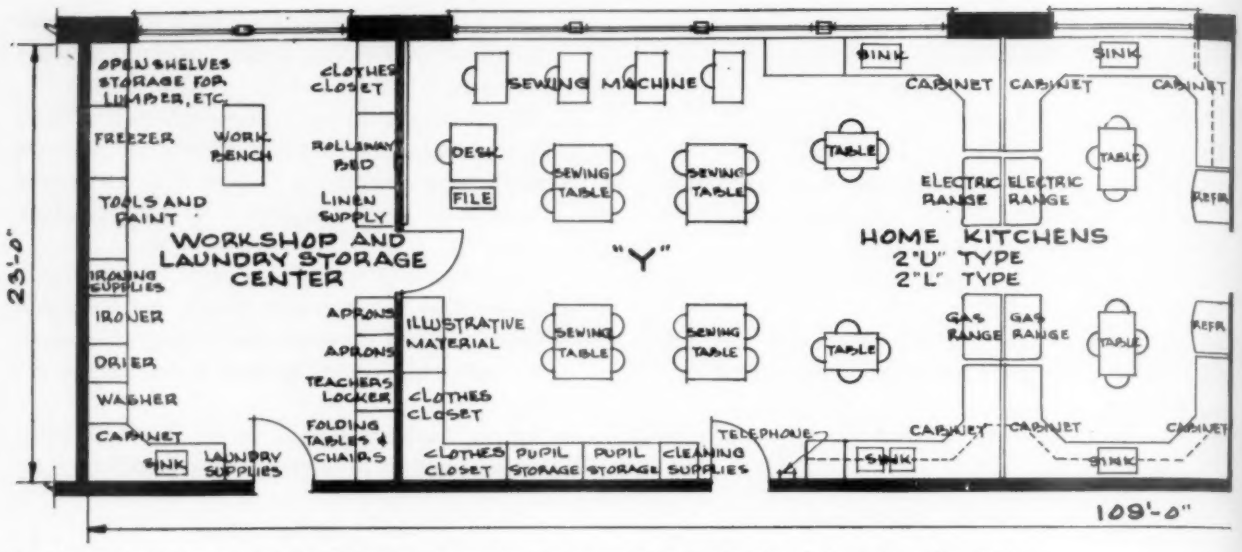
One Teacher Units

When only one teacher is involved the areas should be fairly close together for effective supervision. Units may overlap so that sewing and cutting may be done in kitchen units as well as in the clothing area. In many instances this reproduces a home-like situation and encourages rather than discourages future home sewing. Laundry facilities may be combined with the unit kitchens. Sewing machines double as console tables in the living-dining area; they may be part of the built-in equipment which provides counter space in the kitchen; portable sewing machines may be set up on sturdy folding tables. The living area should be large enough to entertain 25 to 50 guests.

There should be ample storage space for student books, rollaway bed, equipment used in home nursing, child care, grooming and sewing. Aprons, sewing tote

Three unit kitchens plus a living center comprise this one room homemaking department. The plan provides spaces for foods, clothing, child care, care of the home, laundry area and home nursing.





This plan is from "Planning and Equipping the Homemaking Department," The University of the State of New York.

boxes and seldom used equipment may be stored in an adjacent storage room. The one teacher homemaking unit will range from 750 to 1,000 square feet in area.

More Than One Teacher

When more than one teacher is involved, the planning of areas in rooms becomes more complex. With the same objectives in mind, one community may plan a department with an all-purpose room for each teacher in addition to a living-dining room and a laundry-workshop room. This means greater flexibility of space and allows each teacher to manage integrated programs. This would be necessary in communities where vocational homemaking is taught. Another community might plan separate foods and clothing units in addition to living-dining and laundry-workshop units to place more emphasis on skills in major areas. This would be true in a community where homemaking has been taught throughout the elementary grades in addition to grades seven and eight.

A separate foods and clothing area does not preclude teaching of related subject matter. The course of study that deals strictly with food preparation and clothing construction is not inclusive enough to accomplish the broad objectives which have been previously outlined. In junior high schools, classes may be moved into different, well-equipped areas for short periods of time so that during a two-year period a student will have participated in all phases of home-living that meet his or her needs. In senior high schools it is easier to attract boys as students when there is a foods-related area. For adult education the larger areas enable larger class participation.

If a school has a total enrollment larger than 1,200 or if the interest in homemaking courses is high, it may be advisable to have a foods area, a clothing area and an all-purpose area in addition to a living-dining area and laundry-workshop. The all-purpose area would provide space for increased or varying interest in the several elective courses which are offered in senior high schools. Another area which should be considered is a separate child care unit.

Whether planning all-purpose rooms or semi-specialized rooms, these suggestions may prove helpful:

The location of homemaking rooms should be either on the ground floor or first floor so that deliveries can be made easily and so that noises from the home furnishing projects will not disturb classes which may be below.

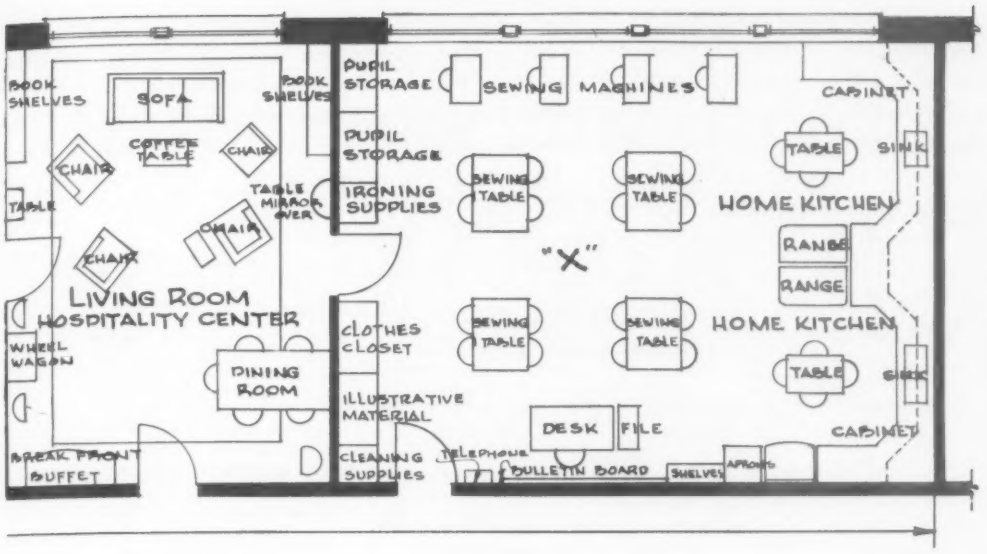
Each activity room should range from 900 to 1,500 square feet in area. There should be a teacher's desk, reference bookcase, magazine rack, cabinet for illustrative material and charts, vertical file for current material, a chalkboard and a bulletin board.

All ceilings should be of soundproof material. Provision should be made for a telephone in the department. Shelves for student books should be placed near the entrance of each activity room.

Foods Area

The minimum size of a one-unit kitchen should be 11 feet by 9 feet or 99 square feet, which allows a minimum counter space of 30 inches per pupil. Unit kitchens that are 13 feet by 10 feet are preferred. Both L-shaped and U-shaped kitchens should be included. It is desirable to have various types of equipment and materials in the units. Stoves should be placed back to back toward the center of the room for easier supervision.

In a unit kitchen for four students the amount of counter space should be approximately the same on either side of the sink. Each unit kitchen should have a table and chairs or a pull-out table, which is under counter space for serving food and for group planning.



A homemaking department of this size can be used by two or three teachers. Variations of the plan would be to place the laundry-workshop center and room "X" across the hall from room "Y" and the living-hospitality center.

Provide at least three electric outlets in each unit kitchen with one of these near the stove; 220-volt outlets should be provided for electric stoves. Each unit should have space for hanging dish towels and cloths.

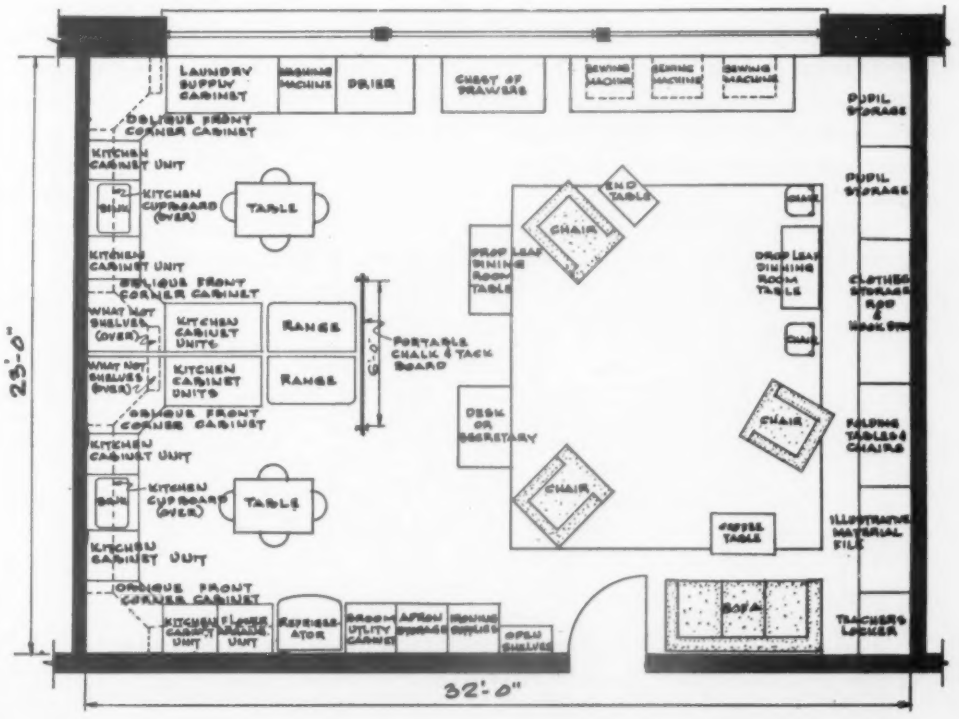
There should be a refrigerator near each group of 2 to 4 units. A deep freezing unit, large enough to meet the needs of classes, should be provided in or near the foods area. An upright freezer seems to be the most efficient for school needs.

A discussion-demonstration area should be available for use of teachers, students and adult groups. This area, in some communities, should be provided with an electric dishwasher and garbage disposal unit (electric sink). Floors of all areas in the homemaking department should be of grease-resistant asphalt tile or linoleum.

Adequate ventilation will carry away food odors. A storage pantry or cabinet, which can be locked, should be near the kitchen units. Other storage should include large cooking untensils, other one-of-a-kind pieces of equipment, apron closets, brooms and cleaning supplies.

Clothing Area

Sewing tables should be 48 inches by 36 inches with 15-inch drop leaves. Tote boxes should be built-in as part of the storage space. The size of the tote tray should be 5 inches deep by 14 inches wide by 18 inches long. Provision should be made for portable or



The New York State Department of Education has suggested this homemaking room in its booklet, "Planning and Equipping the Homemaking Department." The plan includes two unit kitchens and a living center.

stationary ironing boards, with a metal-lined cabinet for storage of irons and pressing equipment. There should be a fitting area with a three-way full length mirror, a platform and a curtain or screen for privacy.

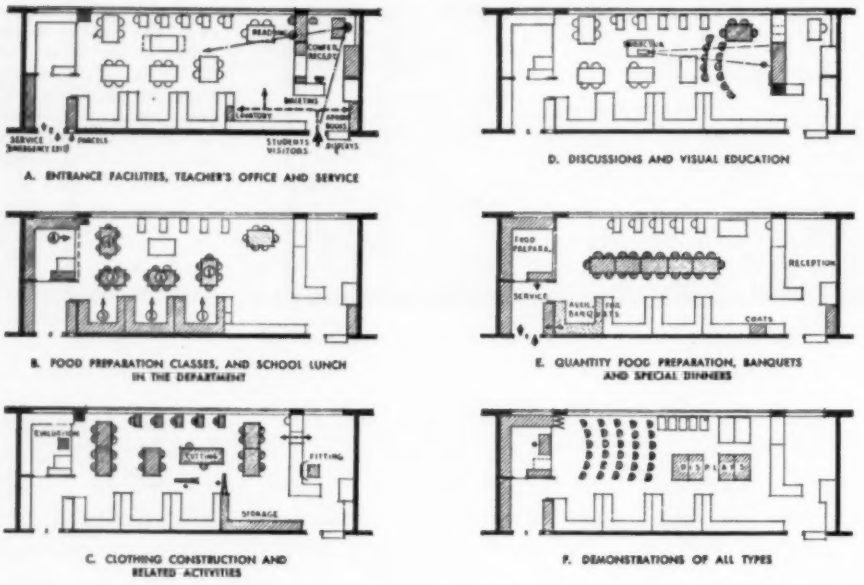
A cabinet for unfinished garments is considered part of the storage equipment. There should be electrical outlets for sewing machines, irons and visual aids equipment.

In senior high schools the grooming unit may be included in the clothing area; in junior high schools it may be in the bedroom, laundry-workshop or in a separate classroom. There should be a fluorescent lighting fixture for the grooming unit. Ample storage space is needed for adult classes.

Living-Dining or Hospitality Area

A large, flexible area is ideal for home nursing, child care, home furnishing, family living, group discussion, film viewing, club meetings, entertaining groups and serving food. The dining table should seat eight.

Storage in this area includes cabinets for magazines, illustrative material, rollaway bed, bed linen, home nursing equipment, samples of home furnishing materials, vacuum cleaner, cleaning supplies and hard tables and chairs. Storage for dishes, silver and linen will be near the dining area. There should be an electrical outlet for every 12 feet of available wall space. The floors may be hard wood.



A one-room homemaking department should permit flexibility of use of space and equipment. Six ways to use one room are suggested in the University of Illinois bulletin, "Principles of Planning the Homemaking Department."

Laundry-Workshop Area

The floor space for this area should measure about 350 square feet. Storage units will provide space for textbooks, large charts, booklets and pamphlets, laundry supplies, tools, paints and flower arrangement accessories. The laundry equipment includes a double sink, washing machine, clothes drier, ironer and an ironing board; a 220-volt outlet is needed for the drier.

The storage cabinets may have doors which are reversible as chalkboards and bulletin boards. A small work bench may be placed in the center of the room. Asphalt tile or linoleum floors are recommended. In junior high schools this unit may include a rollaway bed and a grooming unit.

ARE HIGH SCHOOL SCIENCE FACILITIES ADEQUATE?



by NORMAN R. LOATS

Principal, Riverview Gardens High School, St. Louis, Missouri

Dr. Loats has been a high school principal and teacher for eight years. He has also taught summer classes at the University of Denver. He received his A.B. degree from Central College in Pella, Iowa, and an M.S. from Drake University. Dr. Loats also has an Ed.D. degree from the University of Denver. He is now preparing a book on school plant maintenance and operation, to be published by the Macmillan Company late in 1955.

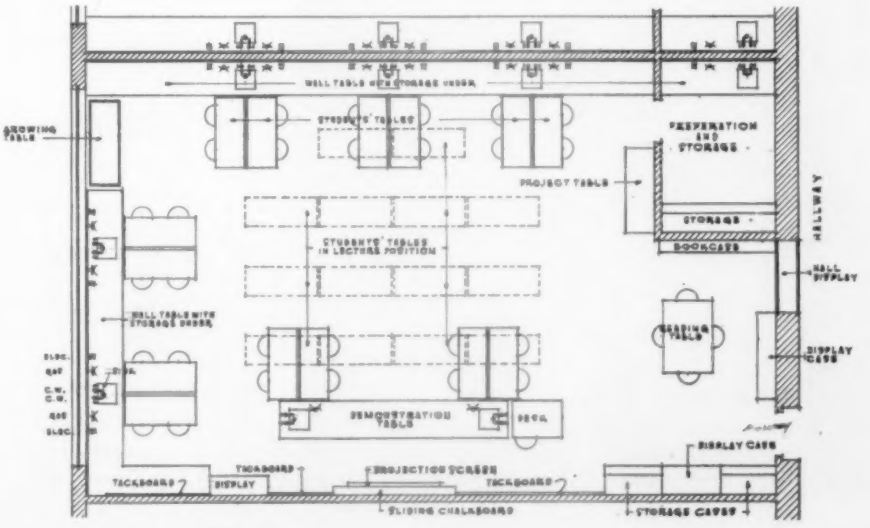
THE role of science in the secondary curriculum and its manner of presentation have been revolutionized during the past decade. Science so pervades our social and material life that without a knowledge and understanding of it effective living is practically impossible. Today, science is more than a recommended field for a college preparatory curriculum, it has become a necessity for ordinary living.

Facilities for the science program have not gone through this same revolutionary phase, and many inadequacies are found. Fifty years ago, when many of the science facilities now in use in the public schools were provided, there was no real awareness of the relationship between science facilities and the development of an acceptable and adequate educational program. Many high school science programs and facilities were attempts to imitate college practices and procedures. College classrooms were planned chiefly for passive learning and did not necessarily reflect the best educational methods for teaching science at the secondary level. The present programs for teaching science are dynamic and possess objectives beyond those of training young scientists. These programs cannot be carried out in science classrooms constructed and planned for phlegmatic educational practices.

Because of the many changes anticipated in the science curriculum and the combining of such courses as chemistry and physics, the physical nature of the classroom must also change. The growing emphasis is upon teaching science as a "way of living," and as an essential part of the general education for all students. The world of science has become synonymous with material benefits, comforts and services to many people and this is a further reason for improving facilities for secondary science programs.

New Rooms Copy the Old

Many high schools recently built or under present construction are copying the antiquated and educationally obsolete science classrooms of fifty years ago. Too often the facilities provided are based upon the

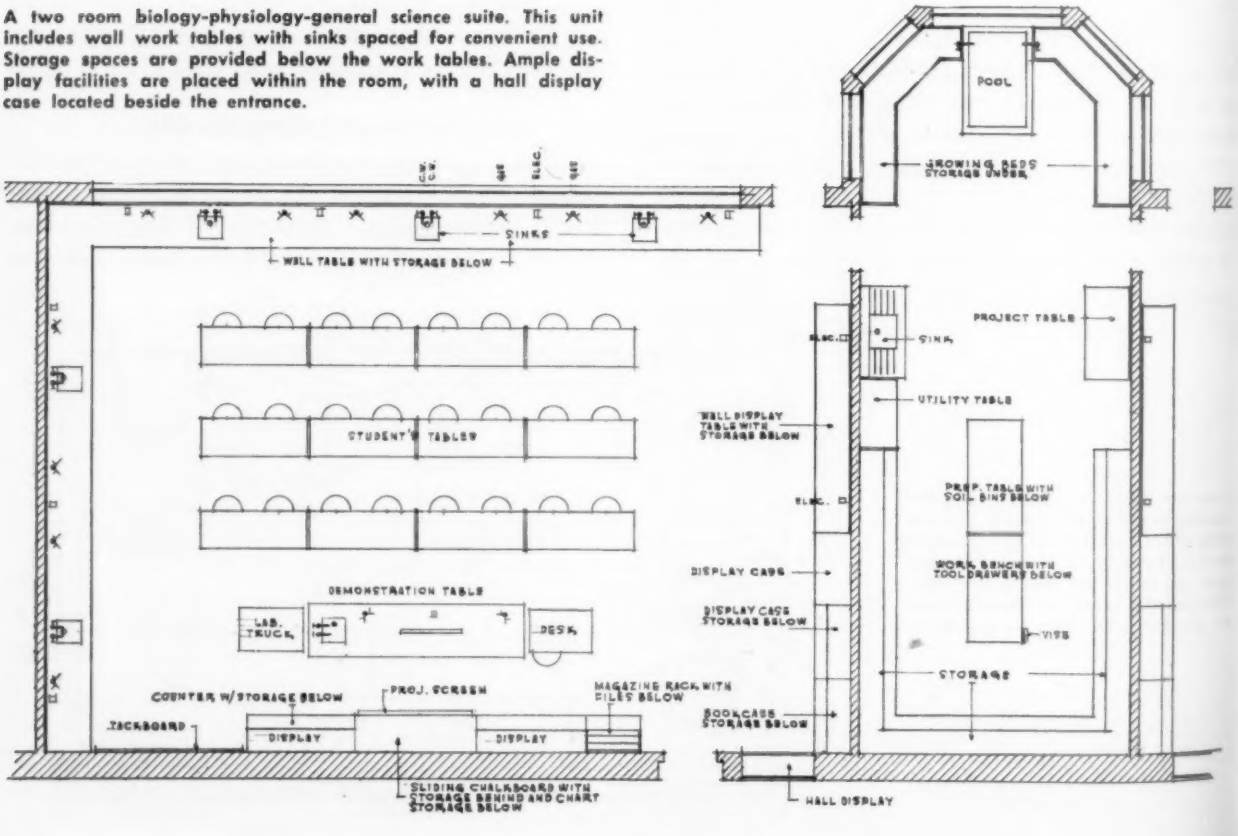


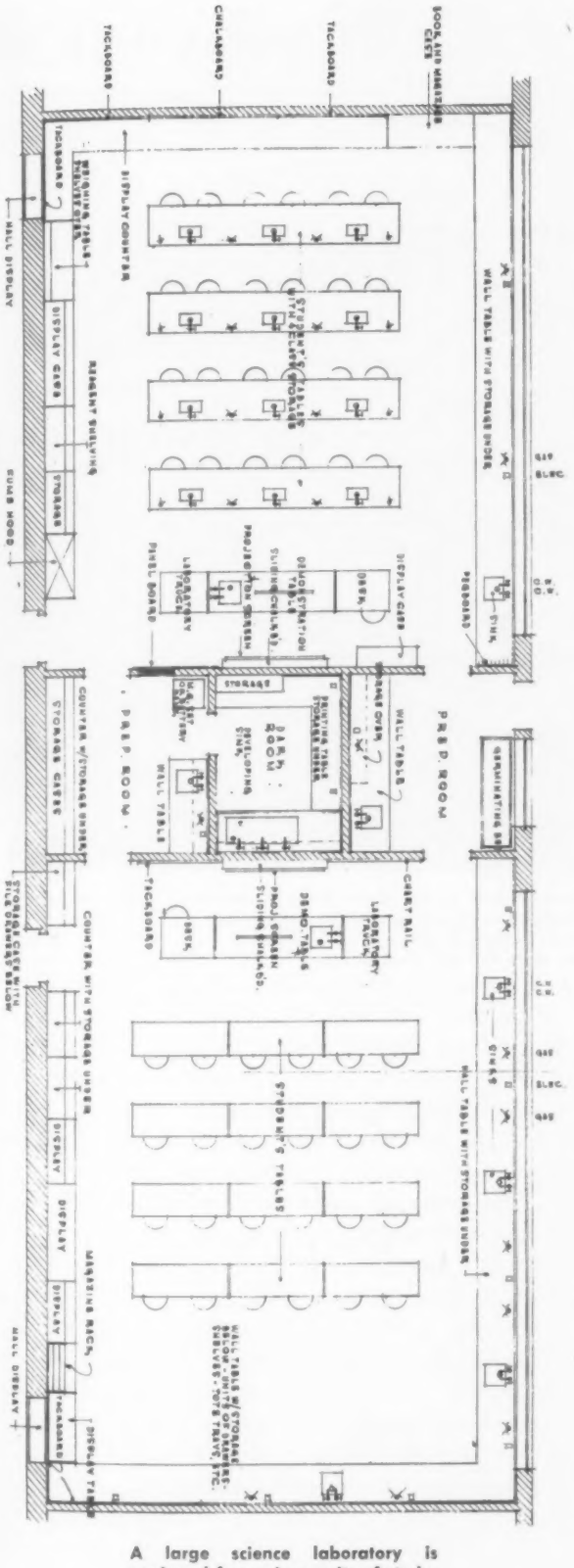
Suggested plan for a biology-physical science-general science room. The students' tables are shown in laboratory position, but can be arranged for lectures, as shown by the dotted lines. (This and the following plans are used by permission of Paul H. De Hurd.)



The science room of the Darien, Connecticut, Junior High School, Ketchum, Giná and Sharp, architects, has a teacher's desk as part of the storage and work space along one side of the room.

A two room biology-physiology-general science suite. This unit includes wall work tables with sinks spaced for convenient use. Storage spaces are provided below the work tables. Ample display facilities are placed within the room, with a hall display case located beside the entrance.





A large science laboratory is equipped for various units of study. At the upper portion of the area are facilities for physics, chemistry and physical science. A dark room separates this section from the biology and general science room.

traditional, and are therefore educationally obsolete from their very inception. A United States Office of Education survey of 715 high school science programs revealed that the three situations most disturbing to science teachers were supplies, equipment and science rooms. Many dissatisfactions were traceable to science facilities and their inconsonance with recent educational methods.

Many Learning Activities

Science rooms are learning laboratories and should be designed to integrate teaching and learning activities, science objectives and science facilities. Science rooms should be carefully designed and planned to accommodate a variety of learning activities. The old method of teacher lecture, teacher assign, pupil recite, pupil experiment, pupil write up formula for teaching is not sufficiently enriching to satisfy present day objectives. The inertia of habit and the failure to realize educational purposes and changes have caused science rooms to be some of the most antiquated areas of our new secondary schools.

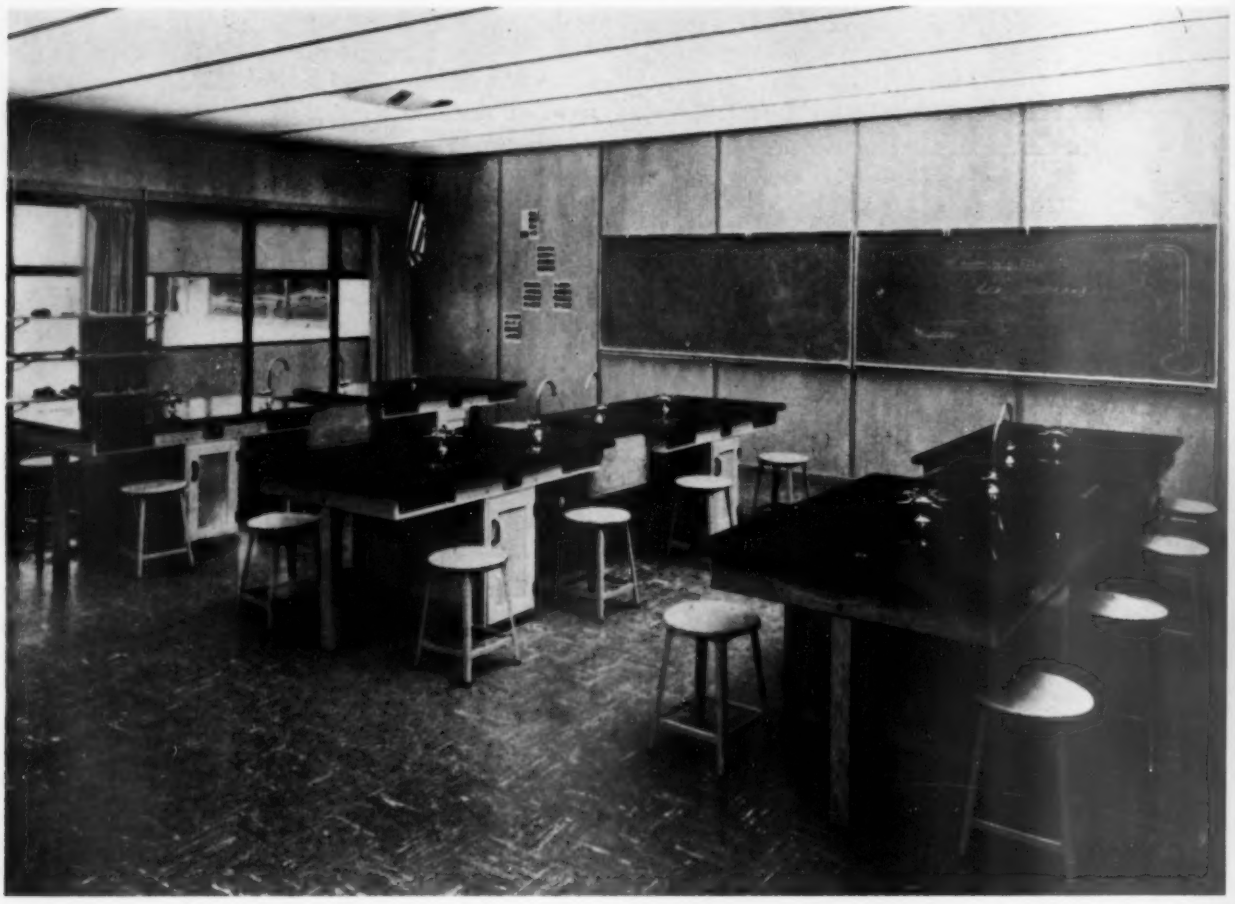
New Objectives Are Needed

Our science age makes it quite mandatory that all students develop some proficiencies in science. The impact of science upon our way of living is causing curriculum changes, new objectives and purposes for

With enough display space student interest can be heightened by interesting exhibits of all kinds.



Oak Ridge, Tennessee, Public Schools



Science room of the Foster Junior-Senior High School in Seattle, Washington. Experiment tables occupy only a portion of this large area. Darkening drapes are provided at the windows to darken the room for audio-visual aids.

science teaching in the secondary schools. Our science facilities should be well evaluated before the increased enrollments hit our high schools.

It is apparent that the demands for science housing facilities will differ from the past and that science rooms will demand and require space suitable for greater and more varied teaching and learning experiences. We will need more science rooms; rooms that will be flexible in nature. The extent to which the facilities are adequate or inadequate will depend upon the educational status of the present science curriculum.

FACILITIES FOR PROGRAMS OF ARTS AND CRAFTS IN SECONDARY SCHOOLS: A SYMPOSIUM

PHOENIX UNION HIGH SCHOOLS AND COLLEGE, PHOENIX, ARIZONA



by RAYMOND C. EMERY

Curriculum Coordinator, Phoenix Union High Schools and Phoenix College, Phoenix, Arizona

Dr. Emery received his Ed.D. degree from Stanford University in 1951. He also has B.A. and M.A. degrees in English. He has a varied experience in education, having taught in elementary, junior and senior high schools. He has been a high school principal, head of the English Department at Phoenix College and a graduate assistant at Stanford University. Dr. Emery also was an officer instructor for the Air Force during his four years of service in World War II.

A GILA monster sunning himself, suspended on the spines of a saguaro; small birds nesting in the desert garden; the commerce of cows, cotton and copper; the romance of the southwest—these and traditional subjects facilitate art instruction in the Phoenix Union High Schools and Phoenix College.

In this fast growing secondary system of seven schools, one of which is a junior college and another a technical high school, both art instruction and art facilities vary. But the guiding philosophy—that art should emanate from local color and that art emphasizes an approach to better living—makes it imperative for instruction to move out of the classrooms, and for this instruction to lean heavily on the environment for its subjects. Consequently, there has been excellent art instruction in these schools, even though facilities have been limited in some cases.

Facilities have been limited in the older schools because of augmented student art interest paralleled with increasing enrollments. The two new high schools, not yet completed, still do not have advanced secondary students.

Room Arrangements and Space

Answering the question, "What is the ideal for room arrangement and space?" the Phoenix Union High School art instructional staffs feel that it is desirable for art rooms to be clustered together. Adequate space should be provided to accommodate individual worktables for each class member, and there should be enough space for working with still life models.

At Phoenix Technical School the work is limited to commercial art. The art studio here is spacious, and each of the thirty students has enough room for his art activities. The Phoenix College art department moved into new quarters last spring. These seem large at this time. Work is done in this department with still models as well as the regular class activities. The instructors' offices are built into the two adjacent art classrooms.

The art department space at Phoenix Union High

The art rooms of the Fine Arts Building of Phoenix College receive an abundance of natural light from the north.





Furniture at Phoenix Technical School includes a large worktable.

School, oldest of the system's schools, is being increased at this time. There is now enough area for students to work with live models, and there will soon be space for individual tables for students. All of the rooms are clustered together, except for the ceramics room.

At both West Phoenix and North Phoenix High Schools increased art interest and enrollments have forced large numbers of students into limited quarters. Rooms are overcrowded with from eight to fifteen students above room capacity. Much of the art work must be done on the campus.

In each of the two new high schools, Phoenix Camelback and Phoenix South Mountain, excellent areas have been arranged for the expanding art departments. Last year, one art instructor was shared by both schools. This year these schools each have an instructor.

Space may be limited at present in some of the schools of Phoenix, but Arizona's sunny skies are most conducive to open air art classes. Consequently, room space has not seriously impeded instruction of the many more students now flocking to art classes. However, crowded classroom conditions certainly tax a teacher's ingenuity.

Basic Room Furnishings

Basic furnishings for rooms in which regular art instruction is carried on should include tables, adjustable for height and slant, chairs or stools, running water and enough room lavatories to permit all students to clean their hands during a five-minute period. A number of demountable easels will serve for display purposes.

In the two new Phoenix high schools the furniture is excellent. There are enough lavatories in the rooms to expedite last-minute handwashings; individual art desks are adjustable, as are the chairs; and there are enough easels in each of the schools for display purposes. Furniture for art rooms in this school system ranges from superior to improvised and old. However, planning in the new schools has been carefully carried out to accommodate the greater numbers of students.

Art Room Lighting

The art staffs of the Phoenix schools have agreed that a wall of north windows is ideal for art rooms in Arizona. The staffs agree, too, that there should be overhead fluorescent lighting, and that strategically placed swivel spotlights are necessary for individual work with models. Artificial lighting will be used by later afternoon and evening classes. Skylights can be used instead of spotlights for daytime individual work.

The two new high schools, alone, meet most of the lighting requirements suggested by our art staffs. These art rooms have walls of north windows and overhead fluorescent lighting. The swivel spotlights and skylights, recommended by the staff, are missing. At Phoenix College the natural light is fused. Art rooms have the ideal wall of north light and adequate fluorescent light; but there is also indirect light from the south. The college art department chairman states that this type of light is confusing to his students.

Chalkboards and Bulletin Boards

Our art personnel estimate that each art classroom should have approximately 60 square feet of chalkboard area, and a cork-surfaced wall from counter height to ceiling for exhibiting finished pieces of art. None of our art classrooms meets these criteria exactly. No school reports inadequate chalkboard space in any of the rooms, but inadequate tackboard surfaces are a common complaint.

Student Lockers

Student lockers for current art projects and completed art pieces should be located inside the art classrooms. Lockers, with minimum dimensions of 12 by 30

Ceramics classes are always crowded at Phoenix Union High School.





Art classes at the West Phoenix High School are separated by a folding partition.

inches and 3 inches deep, can be arranged in tiers about 40 inches high with table tops to create larger work surfaces. Room displays can be arranged on these surfaces also. As many as three art students might share the same locker.

In some of our schools art projects are collected at the close of each class period and kept in folders until the next meeting hour. At North High School all students use metal lockers which are located in the halls. Art instructors at this school have arranged to have the metal lockers nearest the art classrooms reserved for students taking art.

The Technical High School has ideal student locker facilities, according to our art instructors. None of the other schools, except the college, has student locker facilities approaching those of Tech. The facilities at the college are not ideal because the vertical steel locker is not adapted to the flat work of art classes.

Special Equipment

Special art equipment in the Phoenix schools is so varied that no definite criteria can be established, except that this equipment should be useful and it should be safe. Phoenix College, North and Phoenix Union High Schools have ceramics kilns, potter's wheels, clay-throwing tables and hooded spray booths. North also has a ball-mill slip mixer, emery wheel and two small vices.

Darkroom space at the two new high schools was well planned. The darkrooms are approximately 12 feet wide and 24 feet long. Each has a 5 by 8-foot storage closet. The darkrooms are equipped with lead-lined sinks which have drainboards 3 feet wide and 16 feet long. Art photography is just beginning in these schools so the rooms are each equipped with one enlarger and one contact printer. All except the new high schools have capacity photography classes, so there is no question about the use to which this equipment is placed. The same can be said of the ceramics equipment.

Storage Space for Supplies

Art educators in the Phoenix system agree that art departments should have storage rooms that are a minimum of 5 feet wide and 10 feet long. These rooms should have shelves which will accommodate all types and varying sizes of art materials.

The Technical High School, Phoenix College and the new schools have excellent supplies space, but the space in the new schools is unshelved. Storage spaces at four of the schools meet the suggested specifications.

Classes Move Outdoors

Art instructors in the Phoenix Union High School System have not allowed limited facilities to inhibit their instruction. In a few cases crowded classes have been moved from the classrooms out onto the campuses. Since the guiding philosophy of art educators in this system is that art should emanate from the environment, it is possible that a crowded classroom may have a salutory effect on art in this land of sun.

MANUAL HIGH SCHOOL, DENVER, COLORADO



by WILLIAM L. MILLER

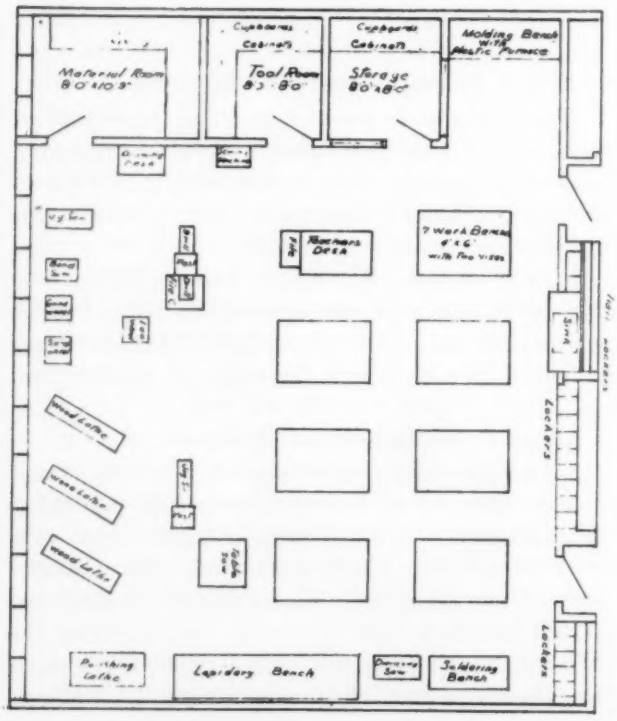
Principal, Manual High School, Denver, Colorado

Mr. Miller has an A.B. from Drury College and an A.M. from the University of Denver. He has served public education since 1922, and has been a teacher, coach, assistant principal and principal of high schools. He has held his present position since 1949.

IN September, 1953, Manual High School of Denver, Colorado, moved into a new building which replaced a small out-moded school in use since 1893. Prior to any architectural planning of the new building, Dr. Kenneth E. Oberholtzer, superintendent of Denver Public Schools, had instigated two studies. The first was a general study applicable to all schools to be constructed in the future. Qualified teachers in each special area met and drew up requirements for spaces and equipment. These room standards became the guide for architects and those planning specific buildings.

For Manual High School a special study was carried on under the direction of Dr. Roy A. Hinderman, deputy superintendent. Use was made of the opinions of community leaders, parents, students and teachers concerning the type of instructional program needed. Analysis of the data thus obtained determined the kind and number of class facilities to be incorporated into the building.

Craft room of the Manual High School has an area of 156.6 sq. ft.



Raymond Harry Irvin was selected as the architect and he received the cooperation of Mr. Graham R. Miller, assistant superintendent for business services. A somewhat unusual feature of the building planning was the degree to which teacher committees were permitted to work directly with the architect on the details which make the various facilities functional.

The Crafts Classes

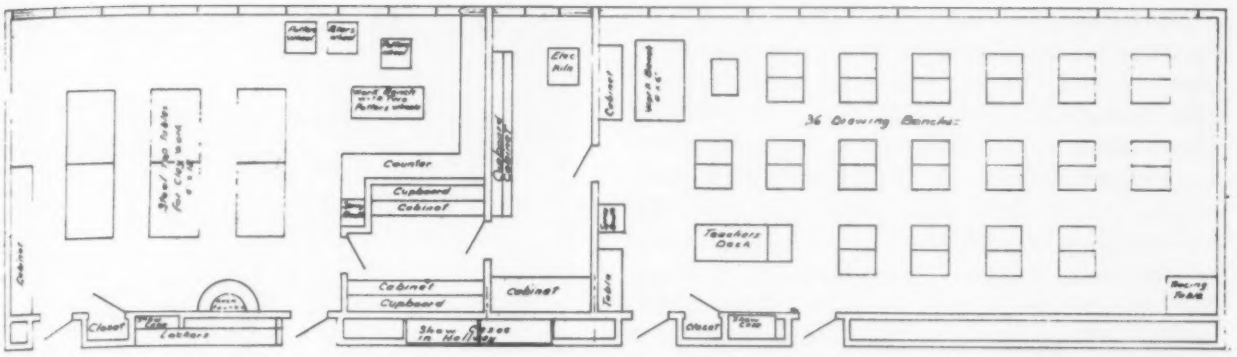
In Manual High School the crafts classes are considered a part of the industrial arts department. Plastics, leather work and art jewelry, including lapidary work, provide the principal media for instruction. The instructional program follows the plan for a general shop in that all areas are in operation simultaneously, according to the needs and desires of the student.

The crafts shop, as constructed, has an overall area of 52 feet by 34 feet. Provided in this space is a storage room, tool room and plan room. Equipment for lapidary work, a heating oven for plastics, other machine tools and work benches are provided. Compressed air is furnished from an outlet connecting with a compressor located in the basement. There are small locker compartments for project storage.

The art area was planned in the same general manner, using teacher experience as a valuable aid. Two art rooms have connecting storage rooms. The ceramics room has an alcoved area for potter's wheels and is equipped with metal topped tables. A spray booth is included in the installation as well as a foot controlled hand washing fountain. An electric kiln is placed in the store room.

Ceramic Techniques

Techniques are taught in making ceramic pieces on potter's wheels by hand and making a model for casting on potter's wheels. Building a ceramic piece by hand is emphasized. "Casting," a method of



Showcases line the hallway adjacent to the ceramics and art rooms of the Manual High School in Denver, Colorado. The two rooms have connecting storage rooms for materials and supplies.

making pottery by pouring slip (semifluid clay) into a plaster mold, and the making of plaster bats and plaques are included in the course. The application and firing of glazes is an important phase of instruction.

The art room is equipped for instruction in pencil, ink and charcoal drawings; painting in pastels, water color and oil; poster making and textile painting. Tables have a tilt top construction with a separate locked drawer for each student and storage space for drawing boards. There are a spray booth and ceiling spot lights for a modeling area.

The two art rooms are connected by storage rooms in which are located clay bins and tool storage compartments. Storage for large paper material was included in the planning. The two rooms and the storage area cover a floor space 96 feet by 24 feet.

As a result of the careful planning which preceded construction, Manual High School has facilities for an active program in arts and crafts. Teachers have found that their time and efforts are conserved, and pupils are responding well to the learning experiences provided for them.

NEWARK, DELAWARE, SECONDARY SCHOOLS

by ELLSWORTH L. HOFFMAN

Industrial Arts Instructor, Newark High School, Newark, Delaware

Mr. Hoffman attended the University of Pennsylvania, Albright College and Millersville State Teachers College. He has an Ed.M. degree from the University of Delaware. His experience includes ten years in industry, three and one-half years in the armed forces and seven and one-half years of teaching in Newark.

THE arts and crafts program in the secondary schools of Newark, Delaware, has been recognized by that description for less than three years. Before that time, separate and expanding programs of art and industrial arts were maintained. It became obvious that increased facilities were needed, not only for these two activities, but also for the program in vocational agriculture. A movement toward closer integration of the art and industrial arts programs materialized during the planning and construction of a new building which now houses the three activities. This building also has separate accommodations for vocational agriculture except heat, toilet facilities and compressed air, which are used in common.

Three advantages have resulted from the integration of the two arts departments: first, there is the avoidance of unnecessary duplication of equipment and a much more economical use of space; second, as the result of this economy it was possible to provide a larger number of activities, i.e., work areas utilizing different materials or processes; third, groups engaged in a variety of activities within the same general area encourage greater interest and knowledge from observation alone.

The arts and crafts area of the building measures roughly 3,600 square feet. The walls are constructed of concrete block trimmed with stone lintels and sills at door and window openings. A shed type roof is broken

to provide clerestory windows along the length and above the interior wall of the shop. Inside measurements are 40 by 60 feet. For economy many refinements in building construction were sacrificed. The concrete block was left unfinished both inside and out except for two coats of tinted "Bondex." The rafters, bridging and roofers are exposed and unpainted in the shop, but are painted white in the classroom. This has not proved objectionable. The classroom floor is of asphalt tile, the storage, machine and hand woodworking floor areas are of cement. The balance of the shop is floored with oak. It is felt that end grain wood block should have been used in place of cement.

Window openings in the outside shop walls, with the exception of three in the wood machine area, have sill levels of six feet. This permits a maximum use of wall space for tool storage cabinets. The agriculture-arts and crafts party wall is of solid masonry, except for a doorway in the interior corner of each shop which gives access to the toilet facilities. Artificial light is provided by banks of fluorescent lights.

Overall Pupil Load

The area requirement of an industrial arts shop is sometimes expressed as 100 square feet per pupil. This includes toilet and storage facilities. On the basis of this, an overall pupil load of 36 may be accommodated in our shop. The chief deficiency of the plan remains inadequate storage for large woodworking projects, particularly when assembled. All under counter space has been utilized for small project and specialized tool storage by the employment of enclosed shelves, cupboard and drawer space. Unfortunately, as is so often the case, the funds available were inadequate and certain unavoidable choices were a necessity.



Members of an 8th grade class work in the machines section.

The classroom and shop areas have sinks in chosen locations to handle clean-up requirements. Compressed air is available in the graphic arts, ceramics and soldering areas for air brush work, glaze spraying and hard soldering, respectively. The heating facilities in the shop are especially to be recommended. An oil burning steam plant serves thermostatically controlled fan impelled unit heaters, located ceilingward. The fans may be manually controlled in warm weather for use as air circulators.

The single classroom provides table or easel space for various activities connected with the art program. One end is separated from the main storage area for supplies by a storage wall designed to the requirements of a miscellany of art stores and equipment. Tote boxes, built as shallow drawers and stored here,

An eighth grade class of boys and girls learns the uses of the many tools and machinery available in the industrial arts shop.



A high school class is manipulating the lathes and drill presses of the shop room. At the rear is located the electroplating area.



contain individual sets of charcoal, colored chalk, crayon, oils or water colors which are distributed as needed. This room measures 20 by 33 feet with north light provided along one long wall. Obscure glass was used below to eye level to minimize outside distraction. The other long wall, along the shop, is double glazed to screen out noise from the shop side. The teacher is thus able to observe and exercise control in both the shop and classroom, when necessary.

Originally, it was intended that the classroom should serve both the art and industrial arts groups. This has not worked out in practice.

The Activities Provided

The activities for which the shop is equipped include:

Machine woodworking
Hand woodwork
Foundry practice
Forge work
Metal spinning
Machine shop practice (lathe work)
Electroplating
Ceramics
Graphic arts
Plastics
Leatherwork
Weaving
Sheet metal (tin can projects)
Jewelry
Art metal
Electricity (fundamentals)

The machine woodworking area is separated from the balance of the shop by a partition of framed plyboard, 3 feet high, glass to a height of 9 feet and closed to the ceiling with "Celotex." This partition helps to control noise and dirt without too seriously limiting visibility. A stock room is located behind the jointer and table saw. Six-foot double doors were required so that long sticks could be started through the jointer and saw from the stock room and, if necessary, continued through a similar doorway in the partition just described. This arrangement conserves space and actually keeps casual traffic from the danger area behind the saw. Other machinery in this area includes a hand stroke sander, 20-inch band saw, 12-inch surface planer and one wood lathe.

The finishing room is located in the outside corner of the enclosed machine area, not desirably but necessarily so. A glass partition helps control dust and transmits light from the outside through to the machines. Three four-station worktables, with steel cabinets below, are used for handwork in wood.

The foundry is located in an area bounded with a three-inch curbing. The gas-air furnace is housed in a pit. The sand bins include a feature which may be of interest. The sand is contained in oil drums with the sides and ends cut to expose the interior of the remaining two-thirds. These drums are fastened solidly to the counter top with turnbuckles and strap steel. A removable cover, in place when not in use, helps to retain moisture. The front and top of the sand bins are removable to permit replacement of the drums when rusted through. A wall type exhaust fan and hood serve both the furnace and the forge.

A second wood turning lathe, which doubles for metal spinning, is placed so that the forge, preferably, or the gas bench furnace can be used to anneal the metal being spun. A drill press can be used as an accessory to woodwork, forging or metal turning. Two metalworking lathes are in almost constant use during high school classes.

Electroplating and Ceramics

A construction similar to a chemistry laboratory hood with movable sash houses the facilities for electroplating. This hood is equipped with locks to safeguard students from contact with the cyanide solutions used in silver plating. A fan exhausts this enclosure as a further safeguard should noxious gases be generated. A small sink for rinsing is built into the counter top.



The partition at the left separates the wood machine area from the leather, plastics and woodworking room situated at the right.

The electroplating unit is back to back with the ceramics area. A small glaze spray booth is exhausted by the same fan used to dispel the electroplating gases. An electrically driven potter's wheel must serve until a kick wheel can be added.

The graphic arts area has little mechanized equipment. The work performed is air brush painting, silk screen and linoleum or wood block printing. The centers for plastics and leather work are located further along the work counter. There is a shop library at the far end.

The equipment for weaving includes a varied assortment of table looms and includes one 36-inch four harness floor loom. A relatively new item is the "Gem

Maker" used in shaping semi-precious stones for jewelry. A 2¼ by 20 by 10-foot bench, mounting four 4-inch machinist's vises, and an increasingly large variety of stakes, forming and finishing hammers represent the chief items of equipment in art metal.

The equipment used in sheet metal, except hand tools, are a stake table, bench shear, 12-inch slip roll, 12-inch brake and a rotary machine. Electricity is the infant offering and is poorly provided for in the matter of equipment.

Purposes of the Program

Our shop facilities are intended to further general education through the actual use, examination and demonstration of as many industrial materials or processes as possible. This seems particularly well advised in the seventh and eighth grades where there is a general ignorance of common industrial terms. These students, after witnessing the casting of molten aluminum or copper, frequently inquire how long it will take to *dry*—a very interesting misuse of a descriptive term important to the individual from infancy. The art and industrial arts sections emphasize the importance of sketching in the work plan, however simple the design. The importance of a planned procedure is given equal emphasis.

Both boys and girls of the seventh and eighth grades are scheduled in arts and crafts, but for unequal periods. The girls' time is divided with homemaking. Scheduling in the shop itself is arranged by the shop personnel and provides that one-third of the total time be spent with each of three teachers working in rather well defined areas. Increased enrollment has reduced the time allotted so that the work produced must of necessity be simple, if quality and a variety of work are expected.

High school classes are elective to art and industrial arts and no rotational plan is followed. Shop facilities are common ground. The program in high school represents an extension of the arts and crafts program of the seventh and eighth grades with continued work in two or three areas on a higher level, while expressed interests are encouraged. The two classes do, with the exception of some overlapping, tend to concentrate in those areas conventionally considered the province of art or industrial arts.

Enrollments Increase

The school population in the seventh and eighth grades has nearly doubled in two years, but the schools of Newark have at least some claim to providing a modern program of arts and crafts for these students.

SENIOR HIGH SCHOOL, NEWTON, IOWA



by B. C. BERG

Superintendent of Schools, Newton, Iowa

Mr. Berg has been superintendent of the Newton Public Schools since 1921. During that time he has been responsible for the plans of seven different school structures. He has an M.A. degree in school administration from Teachers College, Columbia University.

THE new Senior High School at Newton, Iowa, was designed by Keffer and Jones, architects of Des Moines, Iowa. The building was completed at a cost of 1.2 million dollars and has a capacity of 900 students.

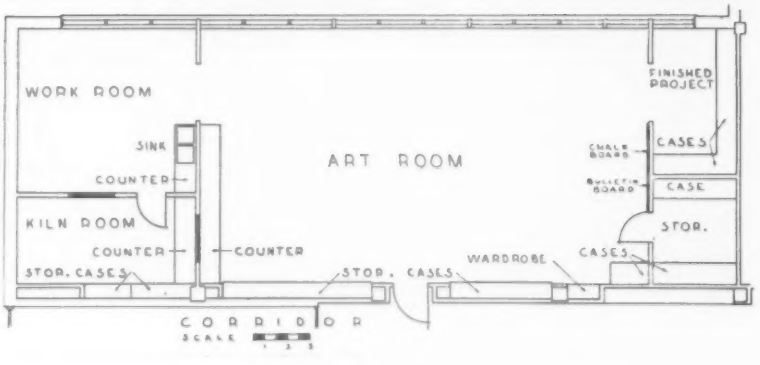
The art room of the school is designed for the varied phases of a diversified program with emphasis on fine arts. There are shops in another section of the high school for the industrial arts program. The main area of the art suite is 39 feet 8 inches by 22 feet, with free opening into a room 12 feet 8 inches by 7 feet 8 inches, where students may store their sketching and painting projects. There are cases with individual shelves for all pupils taking art. Here pupils have safe storage for their graphic work during the time of preparation and after completion.

Another room, 9 feet by 7 feet 8 inches, is for materials under the care of the teacher. There are cases and shelves for storing all the different sized paper and materials used in the fine arts program. Cases line the corridor wall. These contain individual drawers where a student may keep his art tools, paints and brushes. Below the drawers is a row of storage cases where students keep their art tools and equipment. The space above them is used for exhibition purposes.



Tyler Studio

Art room of the new Senior High School in Newton, Iowa, Keffer and Jones, architects, is designed for a diversified program with the emphasis on fine arts. The areas include a workroom, kiln room, art room and storage spaces.



Ceramic and Workrooms

Separated from the main room by part glass, part plaster walls are the ceramic and workrooms. The glass partition enables the teacher in charge to have complete supervision over all areas where pupils are at work. Ceramic work is messy, and the division of areas keeps the remainder of the art suite free from unnecessary litter. The ceramic room has an electric kiln, drying cabinets for clay projects, a potter's wheel, wash facilities, storage spaces for clay and glazing interest and glazes. There is also a worktable.

The workroom contains various machinery, such as drills, saws and buffers, for use when metals, wood and other materials are used in art projects. Most of our art instructors are not yet prepared by training to take full advantage of all the possibilities that this work area makes available, but it is believed that, in time, it will be used to the fullest extent. This area is also divided from the main room to keep out noise and dust, but still enables the teacher to have complete supervision.

Shop Area of the School

The shop area of the Newton High School is consolidated in one section and arranged so that it can be shut off from the rest of the building, heated separately and has separate entrances. Along the main hall is a photographic studio, a shop locker room and a toilet room.

The first unit of the shop area is the woodworking shop. It consists of a paint shop 9 feet by 8 feet 8 inches, equipped with strong exhaust fans for use when lacquer spray is used. Auxiliary rooms within the shop are a storage room for tools and a storage room with shelves where students keep the projects on which they may be working. There is an office for the instructor with windows that give him views of both shops and drafting room. A storage room for lumber adjoins the shop. A 10-foot overhead door leads directly to the parking lot. The open area in the shop is 55 feet by 33 feet 10 inches.

Joining the woodshop is the drafting room which has plenty of cases for the storage of paper of all



The woodworking shop of Newton's High School has an open shop area of 55 feet by 33 feet 10 inches.



The vocational farm shop has its own welding room which is shared with the machine shop. A 14-foot door permits the moving in and out of large farm machinery.



Each unit of the Newton High School shop area interconnects with the adjacent spaces. Several large storage rooms add to the efficiency of the shop rooms.

sizes and drawing instruments, and room for blueprinting machinery.

The agricultural section consists of several units, of which the main areas are the shop and the classroom for vocational agriculture. The agricultural classroom connects with the farm shop through an 8-foot door, and farm machinery can be brought directly into the classroom. The laboratory for testing has a sink and storage places for testing material and counters for work. Glass partitions give full view of the laboratory from either the classroom or the department office. The other room is the agriculture office for teaching personnel.

The farm shop represents a main area of 55 feet

2 inches by 33 feet 8 inches with lumber storage space, a general storage space and a door that opens to the welding room. The welding room is shared with the machine shop. A 14-foot door permits the moving in and out of large farm machinery or projects, like hog houses, that have been built in the farm shop. The welding area has both gas and electric welding and heat treatment facilities.

The machine shop occupies an area 67 feet 8 inches long by 27 feet 6 inches wide. There is access to the welding area and also a large 10-foot door that leads out to the parking lot. Cars and other vehicles can be brought directly into the shop for work on bodies or engines.

Used for Night Classes

These shop areas and facilities are also used extensively for night school and for veterans' classes. Each shop has its own entrance from the outside in addition to the entrances in the main corridor. It represents a very flexible arrangement that meets many needs.

BOISE PUBLIC SCHOOLS, BOISE, IDAHO

by GEORGE H. FIELDS

Director of Secondary Education, Independent School District of Boise, Idaho



Mr. Fields holds an A.B. degree from Central College in Fayette, Missouri, and has an A.M. from the University of Minnesota. He has been an assistant principal and principal of high schools in Iowa and Idaho.

and CHESTER R. COLWELL

Supervisor of Industrial Arts and Instructor in Crafts, Senior High School, Boise, Idaho



Mr. Colwell has a B.S. degree from McPherson College and an M.E. from Colorado Agricultural and Mining College. He has been an industrial arts instructor in various schools in Kansas.

INSTRUCTION in arts and crafts is a vital part of the educational program in the Boise, Idaho, schools. Beginning in the elementary grades, each child has a minimum of two hours per week to receive instruction in these natural media of expression. The art department and the industrial arts group cooperate in planning a program which is correlated with reading, geography, history and science. When a child studies a dairy, he may draw a barn; a visit to the railroad station will be the inspiration for a clay model of a train; and the Christmas season brings an opportunity for expression through seasonal ornaments made from construction paper, tin and other scrap material. As new schools have been constructed in the district, special provision has been made for work areas adapted to finger painting, papier-mâché, clay modeling and other art and craft activities.

The junior high school brings the first contact with arts and crafts as a distinct subject. The course is open to seventh graders on an elective basis and is definitely general in nature; an integral part of the general education program. Introductory units are organized around drawing and painting, color and design.

The crafts phase of the program includes units on block printing, soap carving, leather tooling, wire sculpture, papier-mâché and clay modeling and weaving. During the latter part of the year letter and poster making receive attention. This work is motivated by voluntary participation in local and regional poster contests. Poster design is correlated with science, social studies, safety programs and with the entire visual education activities of the school.

Limited General Shop

Students in grades eight, nine and ten (all in our junior high school) may elect courses in limited general shop. The basic organization of these courses requires that a specified time be devoted to each of certain pre-selected units. All students in the class are engaged in work on the same unit at the same time. Projects, however, may differ. This general shop course is organized with the following units:

1. *Applied Drawing.* The first part of this unit is devoted to the simple mechanics of drawing, measuring, use of the T square and straight edges. A minimum number of drawing projects are included. As soon as this preliminary phase is com-

pleted, the remainder of the drawing activities are related to projects selected for other units.

2. *Woodwork.* This involves the use of hand tools only, most materials being prepared in advance by the instructor. The emphasis here is on accuracy, care in finishing, high standards of achievement and economy of material.
3. *Leathercraft.* This is definitely exploratory work, with concentration on processing techniques. Very little of the activity extends beyond modeling.
4. *Plastics.* An introduction to the use of this interesting material, thermoset and thermoplastic work exclusively. Emphasis is on care in finishing, sanding and polishing techniques especially.
5. *General Metal.* Bench metal processing, art metal, sheet metal and ornamental work, using simple tools. No machine work at all. Raw material in most cases is scrap or inexpensive material.
6. *Elementary Electricity.* The fundamentals of A.C. and D.C. currents; operation and maintenance of home appliances. This basic knowledge of electricity will be useful to any adult.

The Unit Shop Program

The senior high school program (grades 11 and 12) introduces the unit shop. Classes are concentrated in an industrial arts building. Shops are provided for auto mechanics, printing, woodwork, crafts, electricity and radio. Unit courses are offered in:

1. *Drawing and Planning.* These courses include elementary mechanical drawing, advanced machine drawing, architectural drawing and landscaping. Courses, both preliminary and definitely vocational, are available in this general area.
2. *Woodworking.* Offerings include elementary hand tools, machine woodwork and cabinet making. Here, as everywhere, emphasis is placed on high quality workmanship, with close attention to health and safety factors.
3. *Printing.* General printing is available as an industrial arts course. Vocational printing is also offered, which includes operation of a linotype, press work (both cylinder and flat-bed) and work in the hand-setting of posters and ads. This shop is used for school production work only, including the newspaper published by the senior high school, all school forms, report blanks and other general printing for the Boise Independent School District.
4. *Electricity.* A one-semester course is offered in principles of elementary electricity, with practical work in the maintenance and repair of common household appliances.
5. *Radio.* This is a multiple-period course, offered for one or two years at two hours per day. Students learn the mechanics of repairing radio sets. They build individual receiving sets and transmitters, study code and concentrate on the maintenance of military type equipment. This has a practical value, since a great many of the students are employed by the forest service and grazing service during summer vacation. Many of them find ultimate permanent employment in these fields and must be familiar with the care and operation of walkie-talkies and different types of short wave transmitters.
6. *Leather.* The high school leather courses go beyond those offered in units in the general shop course. Special emphasis is placed on creative work. Students are encouraged to originate their own designs which are adaptable to transposal to leather, and emphasis is placed on the production of articles of practical value.
7. *Plastics.* An advanced course beyond the introductory material offered in junior high school, but not requiring the junior high course as a



Students in grades eight, nine and ten in the Boise, Idaho, Public Schools may elect courses in a limited general shop program. The shop shown is located in the West Junior High School.



The open tool rack of the general shop of the East Junior High School has a painted outline of each tool in its proper position. This aids in checking the hand tools at the end of each class period.



Cutout figures, painted with tempera decorate the windows of the South Junior High School library.

prerequisite. Activities include casting, internal carving and tying, etching and advanced fabricating of all types.

8. *Art Metal.* Fabrication from various materials, using non-ferrous metals, including sterling silver; raising and shaping, spinning, press forming, etching (both chemical and mechanical) and modeling with foils, make up units in this course.
9. *Jewelry Fabrication.* Creative work, especially of costume jewelry with inexpensive metals. Simple lapidary work, including cutting and polishing, using local semi-precious stones.
10. *Auto Mechanics.* Open to seniors or boys over 18 years of age. Repair and maintenance of passenger automobiles, trucks and diesel units.

Only auto mechanics, machine and architectural drawing and advanced printing are vocational in emphasis. The advanced radio course is valuable to boys during their military service.

Special Art Courses

Courses in beginning and advanced art are open to all students from the eighth through twelfth grades. Students may take a maximum of two units during the four years of junior high, and two additional units during the two-year senior high period. The use of colors, design and all media of expression are presented on an exploratory basis in the introductory course. During the advanced course students receive additional experience in the use of charcoal, pen and ink, water colors, oil and clay modeling.

Special instruction is given in figure work and composition. In addition to the general art courses, a special course is available in commercial art, with emphasis on signs, posters and show-cards. This course makes an excellent addition to the vocational equipment of a student, girl or boy, who plans to go into sales work in local retail stores. An art appreciation course is available to all interested students.

Objectives of the Program

The arts and crafts program in the Boise Public Schools is designed, first of all, to develop in pupils an interest in industrial life by making them familiar with methods of production and exchange, and by emphasizing the importance of industry to the ordinary individual. The second objective is to develop in pupils an appreciation of design and of quality workmanship. From this naturally develops the third objective, the development of an ability to select, care for and use industrial products wisely.

Closely correlated with the work itself are the objectives of developing in pupils knowledge and a measure of skill in the use of common industrial arts tools and machines, an interest in quality performance and an appreciation of safety. Those students who take the courses are developing an interest in a worthwhile leisure time activity, and are acquiring the skills necessary to enjoy it, both now and as adults.



Greenville High School was designed by R. W. Naef of Jackson, Mississippi. The industrial arts and vocational education units are located at the rear left.

GREENVILLE, MISSISSIPPI, PUBLIC SCHOOLS



by TRACY H. ADAMS

Director of Vocational Education, Greenville, Mississippi, Public Schools

Mr. Adams received his B.A. degree from Mississippi College and his M.S. degree from Mississippi State College. Before World War II Mr. Adams was a science teacher and coordinator of diversified occupations for Mississippi high schools. During the war he was supervisor of war production training in the Jackson, Mississippi, school system. He has served in his present position since 1946.

GREENVILLE, Mississippi, a city of 40,000 population, is located in the heart of the Mississippi, Arkansas, Louisiana Delta. The economy of this prosperous little city is supported by the cotton, corn, rice, hay and cattle produced on the most alluvial soil in the world, and the many small businesses and industries that have been attracted to the community.

During the 1953–54 school term the school system served a total of 6,830 pupils in its white and Negro schools, with 1,375 white pupils in grades 7–12 and 845 Negro pupils in the same grades. There are three elementary schools for white pupils, and three elementary school buildings for Negro children. Of the nine school plants, eight have been built recently or were renovated within the last few years. Two new elementary schools are to be built within the next three years.

Vocational education, as organized in the Greenville Public Schools, includes trade and industrial education subjects and distributive education. Industrial arts courses involve only the practical arts which will provide pupils with some skill in the use of common hand tools. Since their introduction into the junior-senior high school curriculum in the early 1930's, industrial arts and vocational education courses have operated as an integral part of the educational experiences offered to the pupils in this school system. Students are able to gain industrial experiences and information, to prepare for entrance into employment immediately after completing high school, and to build a foundation for further study in trade schools or colleges.

A well planned and coordinated guidance program has been in operation for several years in the Greenville School System. Through the efforts of guidance personnel, teachers and parents, students are encouraged to plan their educational and occupational experiences before entering junior high school, in the seventh grade and continuously thereafter.

Industrial Arts Program

Each boy in the seventh and eighth grades is enrolled in the industrial arts program where he receives experiences and information in seven industrial areas, namely, freehand drawing, electricity, plastics, leather, woodwork, machine shop and art metal. In the high school, beginning with the ninth grade, industrial arts becomes an elective subject in which general metal work is taught. Units in woodwork and electricity are given in the tenth grade, and a full year course in industrial arts mechanical drawing is available.

As a pupil completes his desired courses in the

industrial arts program, he is encouraged to give particular thought to his choice of educational experiences. He may enter vocational classes or non-vocational classes at the end of any school year. Upon graduation, he will be ready to enter employment, college or trade school, as his plans or needs dictate. If he finds it necessary to drop out of high school, he will have had an opportunity to prepare himself for entrance into employment with some definite skills.

The industrial arts program of Coleman High School has developed very slowly. This is because there is a lack of buildings and facilities in the community and because it is necessary for the Negro pupils to develop employable skills at an early age. Many pupils in this Negro community drop out of school before completing the tenth grade. If they do not receive vocational training in the junior high or early high school years, they are thrown onto the employment market as unskilled, partly educated and untrained workmen. These men and women become unemployed or part-time workers who are often unable to sustain a reasonable standard of living. With these conditions in mind, the vocational subjects are made available to a few pupils as early as the eighth grade in order to give those who must leave school early an opportunity to develop some basic skills that can be used to earn a living.

Vocational courses available to the students of Coleman High School include: carpentry, brick masonry, auto mechanics and diversified occupations. Pupils may integrate their vocational studies with other subjects offered in the science, classical and business vocations curriculums.

Adult Education

As students from Greenville and Coleman High Schools enter the employment market they often find that they have not prepared themselves with the necessary skills for making a living. Within a few years they may discover that they need additional skills in order to assume advanced positions in their places of business or to help them secure new employment. These conditions are remedied for all out-of-school youth and adults through the adult education program of the Greenville Public Schools.



A carpentry class is at work in the Coleman High wood shop.

Offered in this program are the non-vocational subjects taught in the elementary and high schools, as well as undergraduate and graduate college subjects that are given through extension departments of the University of Mississippi and other state colleges. Out-of-school youth and adults can work toward and earn an elementary school diploma, a high school diploma, a college bachelor's or a master's degree. They can enter pre-employment or supplementary trades training in part-time or evening classes.

Buildings and Facilities

To implement its program of industrial arts, vocational education and adult education, the Board of Education of Greenville has initiated and partially



The vocational unit of Coleman High School, Kaplan and Dickman, architects, has four main areas: the automotive shop, a classroom, the carpentry shop and the masonry shop.



Facilities of all shops in the Greenville Public Schools are available for use by evening students. Students now learning advanced industrial arts in the Greenville High School may return, after leaving school, as evening students to further their knowledge.

completed a building program to provide adequate buildings and facilities. All shops and classrooms in the high schools, junior high and elementary schools are available, as required, for evening classes.

Shops have been brought into the classroom area of the school rather than being separated. These have been well planned to assure adequate space, generous natural light, forced ventilation, flexible arrangement of work space, up-to-date equipment, and necessary classroom and storage space. Instructors and administrative personnel are well qualified through education and experiences to carry out programs of industrial arts, vocational education and adult education that fill the educational needs of our progressive community.

SNYDER HIGH SCHOOL, SNYDER, TEXAS



by C. L. YARBROUGH

Superintendent, Snyder Consolidated Independent Schools, Snyder, Texas

In his twenty-three years of service for the Texas Public Schools Dr. Yarbrough has been a superintendent, principal, teacher and staff member of the Texas State Department of Education. He received his B.A. and D.Ed. degrees from the University of Texas and has an M.A. from Southern Methodist University.

ARTS and crafts have become a major interest of the Snyder High School students. Even though it is an elective subject, classes are always full with more than 14 percent of the student body—both boys and girls—enrolled in the program during the first year. If this interest is maintained for a four-year period, approximately 60 percent of all students will be involved in a one-year program of arts and crafts sometime in their high school career. A major limiting factor in reaching a larger number of students at present is the lack of space available for teaching this subject.

The course of study was developed by the teacher and department head and was not patterned after any other program. It was adapted to meet the particular interests and needs of the Snyder High School students and to utilize the resources of this community. Since 1949, Snyder and the surrounding territory have become an important oil producing area, and agricultural activities, which had ranked first, have become second to industrial interests.

Prior to 1952 there was no program of industrial education in the Snyder schools. A careful study of the



Various hand and power tools are utilized in the art metal classes of the Snyder High School. The student learns to form art metal into many usable items.

interests and needs of the community was conducted by the staff in 1952-53. With the help of a small citizens advisory committee the staff developed a comprehensive program of industrial education which included a separate unit in arts and crafts. The total program adopted included arts and crafts in the elementary school, taught in relation to other subjects, a separate course in the junior high school and an advanced course in the senior high school.

The activities and experiences of students in the elementary and junior high schools have a direct bearing upon the scope and content of subject matter of the high school arts and crafts program.

Courses Are Elective

In the secondary school, as well as in the junior high school, students are permitted to take arts and crafts as an elective subject. There is no prerequisite and all students from grades 9 through 12 are eligible. Most of the classes, therefore, include groups with a four-year range in classification. Only a one-year course is offered, and no consideration to date has been given to adding a second year's work.

The program of instruction is built around four major centers of interest, which are carried on simultaneously in each class. For instance, a group of 20 students may be divided into four groups, each having to do with a major center of interest, but students select individual projects through which they learn the fundamentals of this particular part of the program. Each center of interest is given approximately one-fourth of the total year's time and students are rotated regularly at each quarter semester. By the end of the year the student has developed capacities in each of the four centers of interest now being taught.

Projects selected by the individual student with the approval of the instructor are adapted to his particular aptitude and interest. Thus, one student may select a very complicated item to complete, and another student may be allowed to begin with a simple project suitable to his ability. Students pay for the materials which they use, and the completed projects become their property. Exceptions to this occur frequently, however, as this department prepares souvenirs as evidences of class work for chamber of commerce functions, parent-teacher conferences, teacher meetings, and other occasions as a contribution to wholesome public relations. Such projects are planned as part of the teaching program.

Twice each year an exhibit of student work, together with exhibits from other phases of the industrial



These tools are used to tool, stitch and preserve leather. Students are able to make items for gifts or personal use, such as leather belts, billfolds or jackets.

education department, is presented to the general public. This exhibit has won wide-spread acceptance on the part of patrons and students.

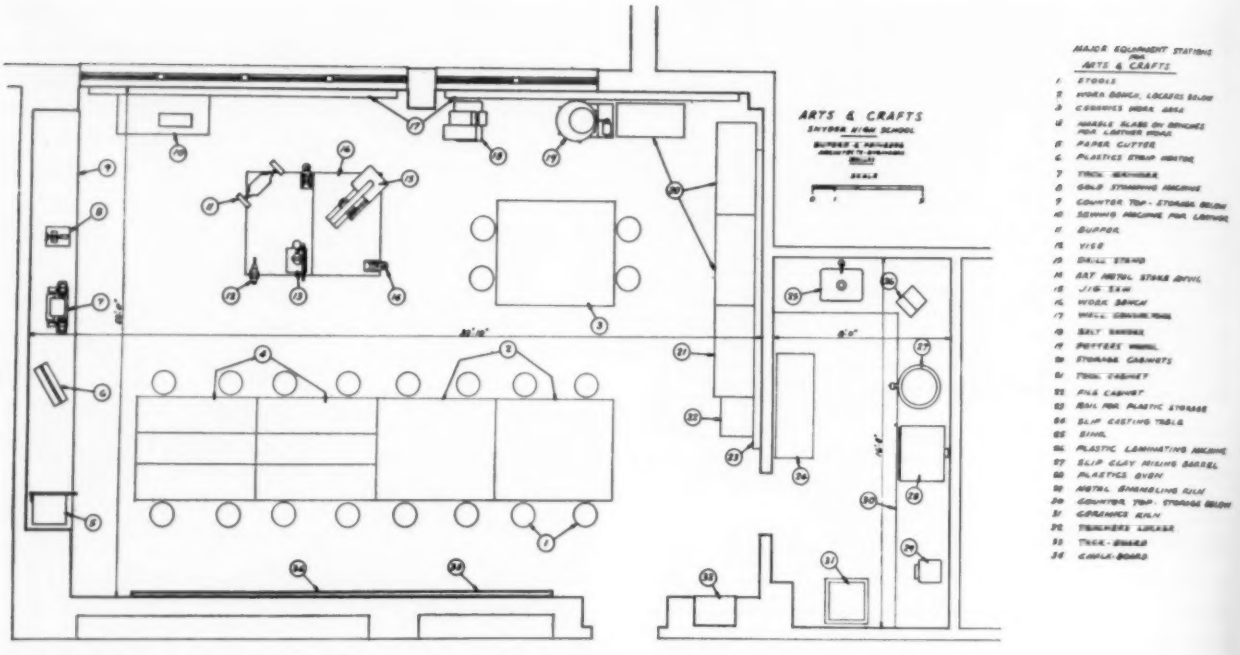
Major Areas of Instruction

The four major areas of instruction (centers of interest) at present are as follows:

Leather Craft: In this area specific attention is given to developing a recognition of the important uses and varieties of leather, and to developing proficiencies in making useful items. The student learns to use the

From left to right are the clay mixing barrel, oven for heating plastic, metal enameling kiln and a flexible shaft machine for carving plastic.





The Snyder High School arts and crafts laboratory has 875 square feet of area. The four phases of the program include leather craft, plastics, art metal and ceramics. All equipment is carefully arranged for maximum efficiency.

tools which are needed for working with leather, and the processes of tanning, tooling, stitching and preserving through which leather is finished and made useful. Students learn to make leather belts, billfolds, etc.

Plastics: In the study of plastics, the student acquires a working knowledge of its uses and learns the mechanics of making raw material into various usable items such as laminations, jewelry and decorations. The student learns the various methods of forming plastics, the use of color, polishing, internal carving and other processes essential to its refinement.

Art Metal: The student learns to form art metal into usable items. He must become familiar with the processes of heating and cutting, pickling, shallow hollowing, raising, planishing, applying finishes, etching, enameling and all other techniques which are required in the use of art metal.

Ceramics: In ceramics the student becomes familiar with the various techniques needed in mixing clay, making plaster molds, underglazing, free forming, decorating, use of decals and the various methods of firing and baking to secure proper results.

In each of these units the student learns the proper use of the equipment with which the projects are completed, as well as technical skills required in operating the equipment and in finishing the project.

The Snyder High School arts and crafts laboratory contains 875 square feet of area. This accommodates the minimum equipment needed for all four phases of the crafts program, and will accommodate approximately 20 students per class. The floor space is not sufficient, but careful arranging of equipment has minimized this defect.

Diversified Program

One of the advantages of carrying on all four phases of the program at the same time is that diversification stimulates interest. But another is that a small group working in each area reduces the number of hand tools and special equipment needed for any one area at any one time. Much of the large equipment can be used for all four major areas of instruction. A notable exception, however, is that bake ovens are required for both plastics and ceramics.

Most small tools are made for very special uses. They are kept within a cabinet stationed inside the room and available to each student as he needs them. These include mallets, hammers for art metal, modeling tools for ceramics, carving tools for plastics and leather craft tools or machines.

The program of arts and crafts has been under way in the Snyder High School for too short a time to properly evaluate its effectiveness academically and otherwise. However, it is already obvious that this program is attracting a ready response from students in the Snyder Public Schools.

SPACES AND EQUIPMENT FOR GRAPHIC ARTS INSTRUCTION



by HAROLD C. HILL

Graphic Arts Teacher, Durfee Intermediate School, Detroit, Michigan, and Member, Cooperating Faculty, Wayne University

Mr. Hill has an A.B. degree from Michigan State College, East Lansing, Michigan, and an M.Ed. from Wayne University, Detroit. He is a member of the Department of Industrial Teacher Education in Detroit and an instructor of Graphic Arts, cooperating faculty, at Wayne University.

GRAPHIC arts is rapidly becoming a popular shop course among students. The modern graphic arts laboratory serves as a workshop for integrating all subjects and activities in the school program; English, spelling, art, mathematics and social studies are emphasized in the work. It is a school service laboratory and can stimulate and vitalize all activities in the school. Graphic arts education furnishes a basic background for intelligent and appreciative future readers, users and buyers of printing.

Graphic arts activity in an industrial arts program includes the elementary printing methods, limited largely to hand composition, hand-fed presswork, hand bookbinding, hand paper-making and printing art work, including rubber plate, linoleum block and wood cuts, and the silk screen process. This type of program does not stress the development of personal skills and specific applications but is broad in exploratory values and consumer knowledge of tools, products and problems of the industry. It is an introduction to rather than a preparation for the printing industry. The program is useful to everyone and should be regarded as worthwhile general education.

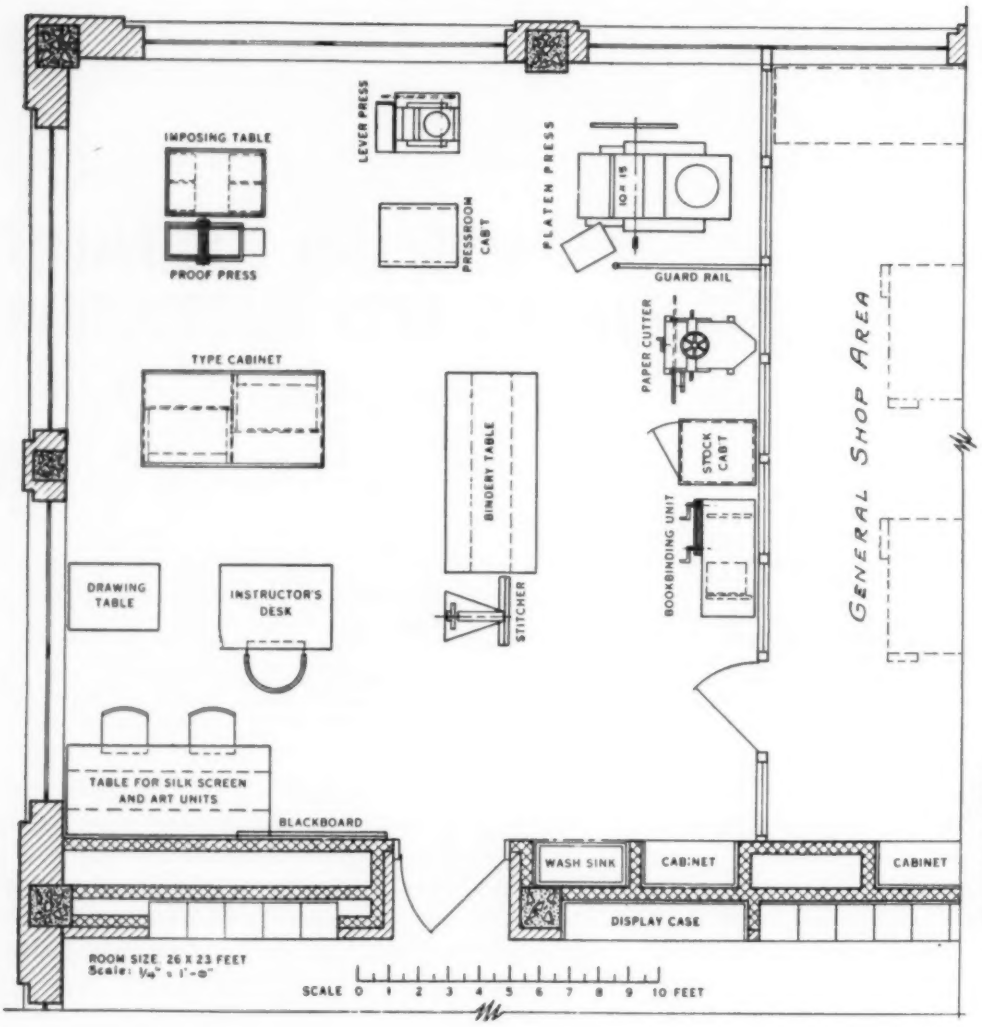
A good graphic arts course will aid young men and women in selecting an occupation that will enable them to earn a pleasant and useful livelihood. It should be an aid to industry inasmuch as it helps students discover their aptitudes for various jobs in the printing field. After completion of the course, students who display real talent for and interest in the field may continue study in vocational or trade schools or become apprentices in industry. The general knowledge gained would give any apprentice an intelligent and appreciative introduction to his line of work.

Basic Equipment of the Shop

Graphic arts should be considered as an important subject worthy of being taught in a properly equipped shop. In devising a floor plan for a graphic arts shop there are certain fundamental factors to be considered. All shops should be equipped with type cabinets, presses (pilot, platen or cylinder), paper cutter, proof press, binding equipment, bookbinding table or bench and a bench on which silk screen and other art projects can be explored.

Definite functional relationship between all items of graphic arts equipment determines their correct location and provides for efficiency in class organization and operation. A shop which is rectangular in shape is more manageable than a T, L or U-shaped room. Proportionately the shape of the rectangle could be 1:1.5 or 1:2.

Aisles are extremely important in the graphic arts shop for there is considerable movement of individuals and materials. Wide aisles of travel should be provided between type cabinets and machines, also in front of storage lockers and tool panels. Aisles should be three to four feet in width to allow easy movement of mate-



This graphic arts unit for junior and senior high schools is proposed by the Educational Services Department of American Type Founders. The unit will accommodate a class of from 6 to 10 students at one time.

rials through the shop and to minimize interference with the work stations.

Proper layout eliminates unnecessary confusion and promotes discipline. Safety rules should be carefully observed in placing equipment. Lighting of the room is a prime consideration. Equipment should be located so that light from the windows enters at the side of each pupil as he works. Students should not have to work in their own shadows nor should they face the light. In first floor rooms the lower half of windows could be translucent to reduce outside distractions.

Floors should be wood or composition, for the work done by the students is relatively clean and free from oil or grease except near the presses. The setting of type requires students to stand and wood or composition is more comfortable for standing than concrete.

Cleanliness is an important factor in producing fine work in the graphic arts and proper facilities for washing hands are necessary. Drinking facilities might also be provided within the department to eliminate unnecessary movement outside the classroom.

Power arrangements for the graphic arts room are quite similar to those for other industrial arts shops. Power presses require 220 volts, three phase. Lights and outlets use 110-volt current. Outlets should be provided at the bookbinding and silk screen benches so that electrical current will be available for lettering pallets, glue pots, stoves, etc. Outlets should also be placed in the lecture area for the showing of visual aids.

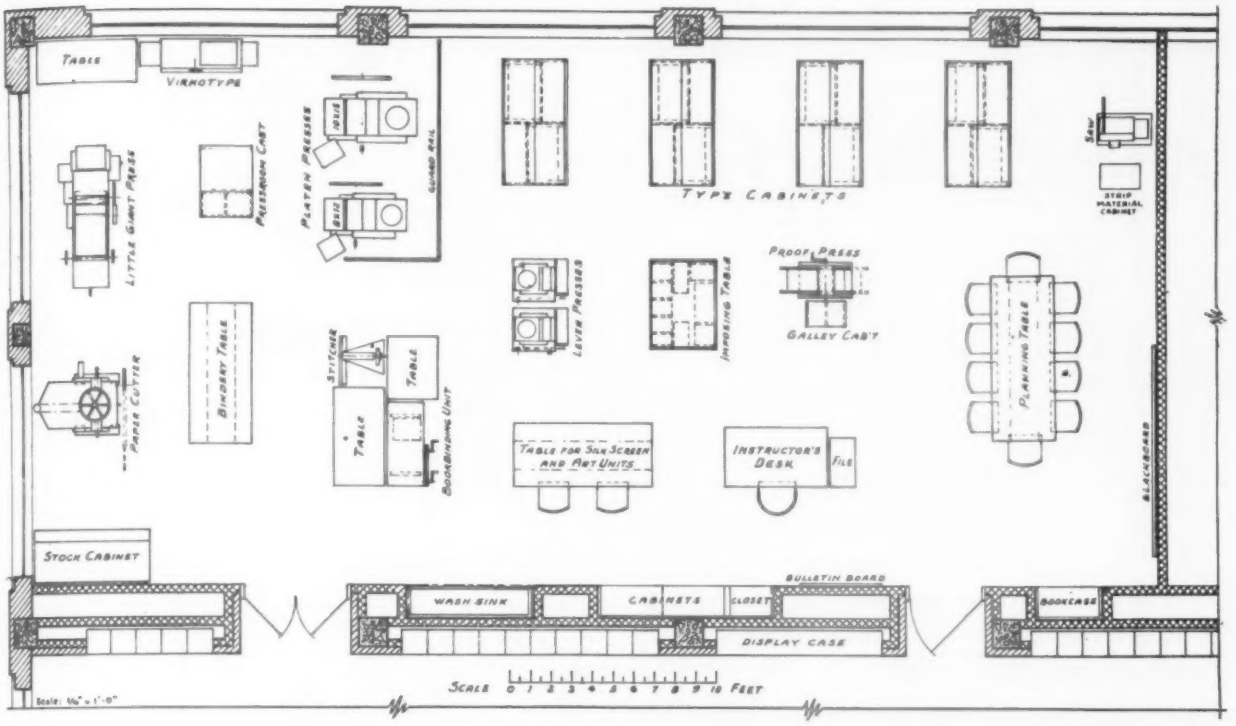
Facilities for Displays

Since much of the teaching of graphic arts depends upon visual aids, some wall space should have tackboards for bulletins and display of the student's work. A display cabinet that can be viewed from the classroom and corridor is ideal for exhibiting work of the students.

There should be at least one locker for each class so that students can store aprons, work books and other materials that they may leave in the classroom.

Storage and Supplies

Storage facilities are needed for work in progress as well as for tools and materials which are not in use



A class of 20 to 24 students can be accommodated in this proposed graphic arts unit, suggested by the Educational Services Department of American Type Founders, Elizabeth, New Jersey. Overall size of the room is 26 feet by 55 feet. This unit contains a composing room, press room and a bindery, with a table provided for silk screen and art units. The composing room contains the type cabinets, saw trimmer, strip material cabinet, proof press, galley cabinet, imposing and planning tables. The press room has one cylinder press and two platen presses, two lever presses, a cabinet and stock table.

at all times. The stone can be used for the storage of chases, furniture and standing service as well as for students' galleys of jobs in the process of being typeset. The stone at the Durfee Intermediate school in Detroit provides space for 176 galleys or space for five classes of more than thirty students. A steel constructed galley cabinet with a capacity of 50 galleys, 8¾ inches by 13 inches in two tiers, may be purchased if desired.

Tools and supplies should be located as near the work area as is practical to reduce travel and interference. Bookbinding tools can be placed on a panel above the working area or in a separate cabinet, with necessary supplies stored underneath the work bench or in cabinets. There is available a bench for silk screen work which provides storage space for paints, adhering liquid, stencil remover, varnish, rags, etc., as well as silk screen frames if not too large. Large screens can be hung on a panel above the working area or placed in a special cabinet. This same silk screen area can be used for the completion of linoleum block cutting, rubber plate cutting, paper making and dry point etching.

The manufacturer of rubber blocks also supplies the necessary tools, such as engraving tools and T squares. Silk screen frames can be built in the school wood shop or can be purchased with other screening supplies. Bookbinding equipment and benches are available from several manufacturers, but ordinary wood shop benches can be used.

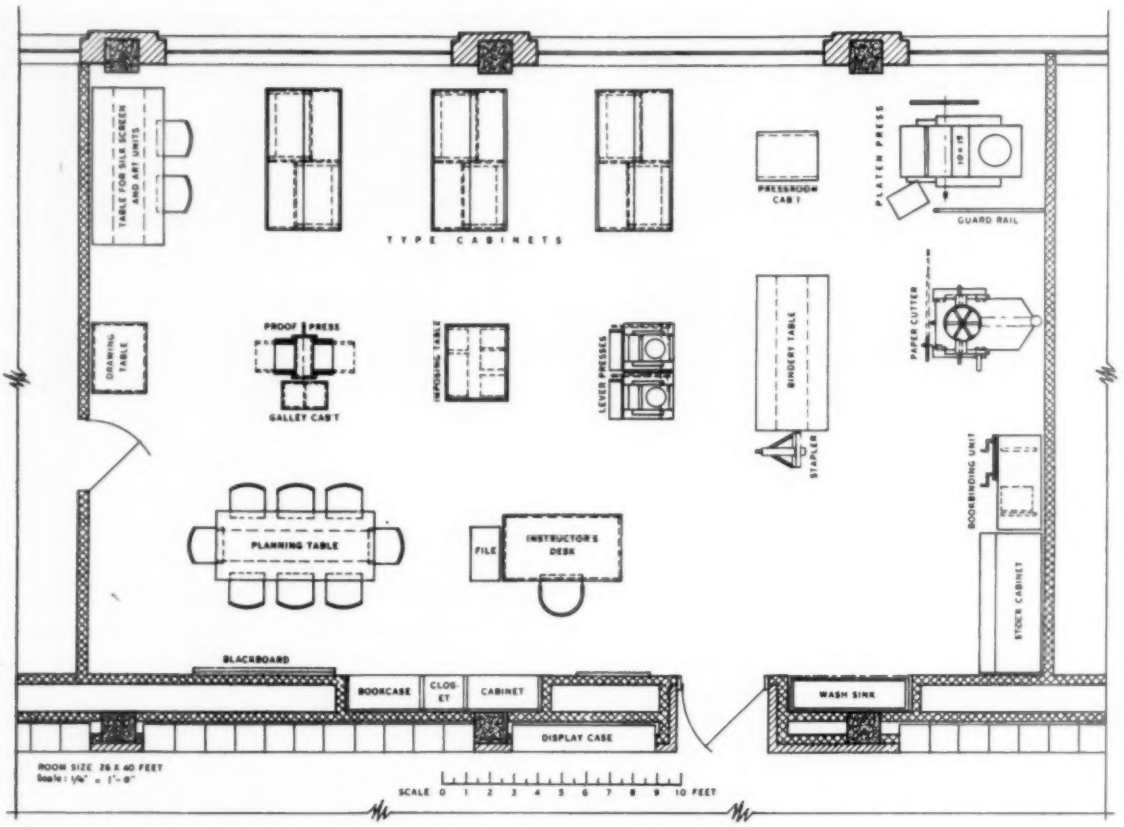
Paper storage facilities should be provided near the paper cutter so that large bundles of paper will have to be carried only a short distance. Wide double doors give easy access to the paper supply room or cupboard. According to a survey made by Willard M. Bateson, University of Alabama, 1,000 cubic feet is the standard amount of storage space needed.

Type cabinets which occupy a floor space of approximately 42 by 33 inches, depending upon the make purchased, provide working stations for two pupils, storage space for sixteen standard California job cases, as well as space for slugs and leads.

The Printing Presses

Pilot presses, or hand lever presses as they are sometimes called, may be placed on a cabinet which occupies a floor space 49½ by 24½ inches. The Detroit school printing teachers have recommended one pilot press for each twelve students.

At least one platen press should be installed. It may be advantageous to install two platen presses and, if older boys work in the shop, a small cylinder press might also be included. A small platen press occupies floor space approximately 5 feet by 4 feet, depending upon the make. There should be a two-foot clearance



This 26 feet by 40 feet graphic arts unit will accommodate a class of 15 to 20 junior and senior high school students at one time. A wash sink, cabinets, bookcase and chalkboard line two of the walls. The planning table and instructor's desk are located next to each other. (This unit was also recommended by the Educational Services Department of American Type Founders.)

on all sides except the front of the press where the space allotted should be three feet.

The safety factor should always be considered in the placing of presses in a school shop. Presses should never be located in or near a thoroughfare aisle where passersby might interfere and distract the attention of the operators.

An important part of any graphic arts shop is a planning center or bleacher area. An open part of the shop does very well for this purpose. Sometimes this area is partitioned to eliminate noise and distractions from activity work within the shop. Shelves should be included here so that all necessary reference books will be readily available. Equipment and aids needed for the various kinds of planning can be stored here, too.

In planning a shop remember that all equipment should be placed so that the instructor can make a complete survey of the entire room without difficulty. He should have an adequate desk, chair and a four-drawer file for plans, sample work and correspondence.

All shops should have fire extinguishers, a fire blanket and a first aid kit. An intercommunication telephone or public address system throughout the entire school is extremely beneficial to any good teaching.

The kind and amount of equipment selected for any shop depends mainly on the size of the class, the grade level of the pupils and the type of activity to be taught.

NEEDED: BETTER TEACHERS' FACILITIES



by J. STANLEY SHARP

Ketchum, Giná and Sharp, Architects, New York City

Mr. Sharp received his Bachelor of Architecture degree from New York University. Before starting his own practice, he worked with a number of well known New York architectural firms. For many years he served as an instructor in architectural design at Vassar College. Mr. Sharp is a member of the AIA, the Architectural League of New York and the Beaux-Arts Institute of Design.

MOST school buildings of today, no matter how well planned, still have inadequate social living facilities for teachers. There are many reasons for this. First and foremost is the public apathy toward spending money or devoting school space to such areas at a time when the need for classrooms is so imperative. The public must be made aware of the fact that any economies are unwise which are detrimental to the main purpose of a school—securing the best possible education for their children. Economies which deprive the teacher of adequate social living facilities will be harmful to the whole teaching program.

Teachers are human beings and must be treated as such. Yet, mention the phrase "teachers' lounge" to a school committee and immediate objections will be raised. The use of the word "lounge" is misleading and shows a lack of understanding by the planners themselves. Although, among many other uses, the lounge is intended as a place for teacher relaxation, its primary function is as a social *work* area.

There is no doubt that the schoolman realizes how important it is for teachers' facilities to be well planned. It is his duty not to neglect them in the planning phases through fear of public reaction and resistance. As in all cases dealing with the public, the educator's first problem is to inform the community. Community understanding leads to community acceptance.

Attempts to inform the public are best carried out gradually as part of a long-range educational program. Before the public will approve of providing areas designed to increase the efficiency of teachers, they must recognize the need for these facilities. They must realize how much adequate work space and pleasant relaxation areas mean in the development of a happy, efficient teaching staff.

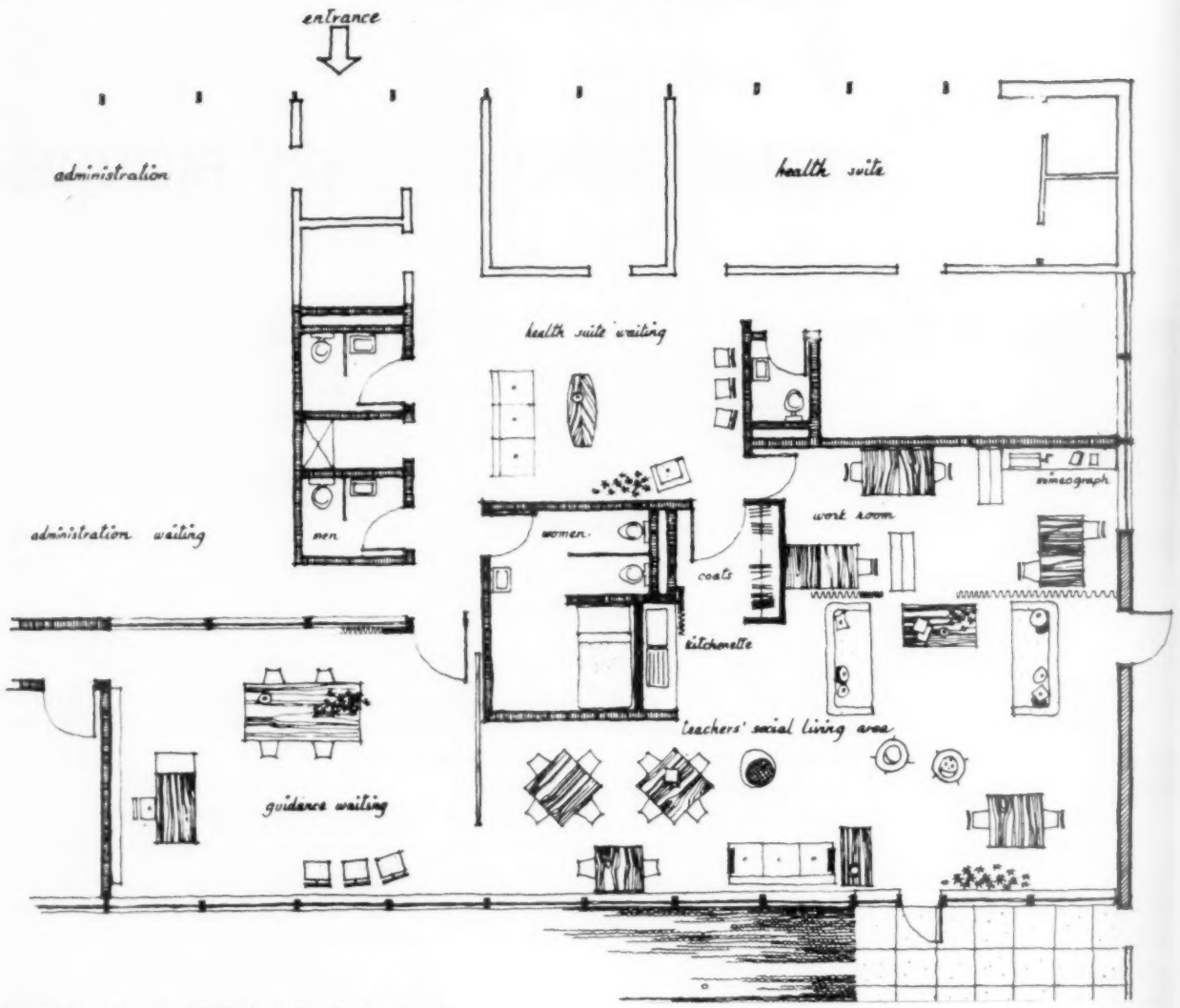
A Place of Privacy and Quiet

Actually, what educators are striving for is to provide teachers with a place of privacy and quiet during working hours. This ties in with the idea of good organization. Teachers who work together with the same group of students should have a convenient private place where they can meet with each other to discuss common problems.

Even when the space allotted for teachers as a recreation-work room is limited in area, much can be done. For example, in the Northport Senior High School, Northport, Long Island, efficiency and privacy were combined in a 750-square foot teachers' living center. This area includes a living room, kitchenette, workroom and mimeograph section. Ketchum, Giná and Sharp are the architects.

In secondary schools a nearly ideal setup for a faculty of 40 teachers would be a recreation-work room about the size of the one at Northport. If more space were available, say 30 feet by 50 feet, it would be possible to build individual carrel-like compartments which would ensure a maximum of privacy for the teachers. If necessary, two or three of these booths could be joined or the entire system staggered, so that the feeling of individuality might still be retained.

Whenever possible, this room should have a pleasant orientation as to sun, breeze and outlook. In keeping with the privacy motif, it should be separated from the main part of the school though accessible to it. This psychology of separation helps create the idea of a



Floor plan of the teachers' living center at the Northport Senior High School, Northport, Long Island, by architects Ketchum, Giná and Sharp. This is a basic layout which combines efficiency and privacy in a 750-square foot area. The social living area can be separated from the workroom and mimeograph area by folding partitions. There is a small kitchenette included.

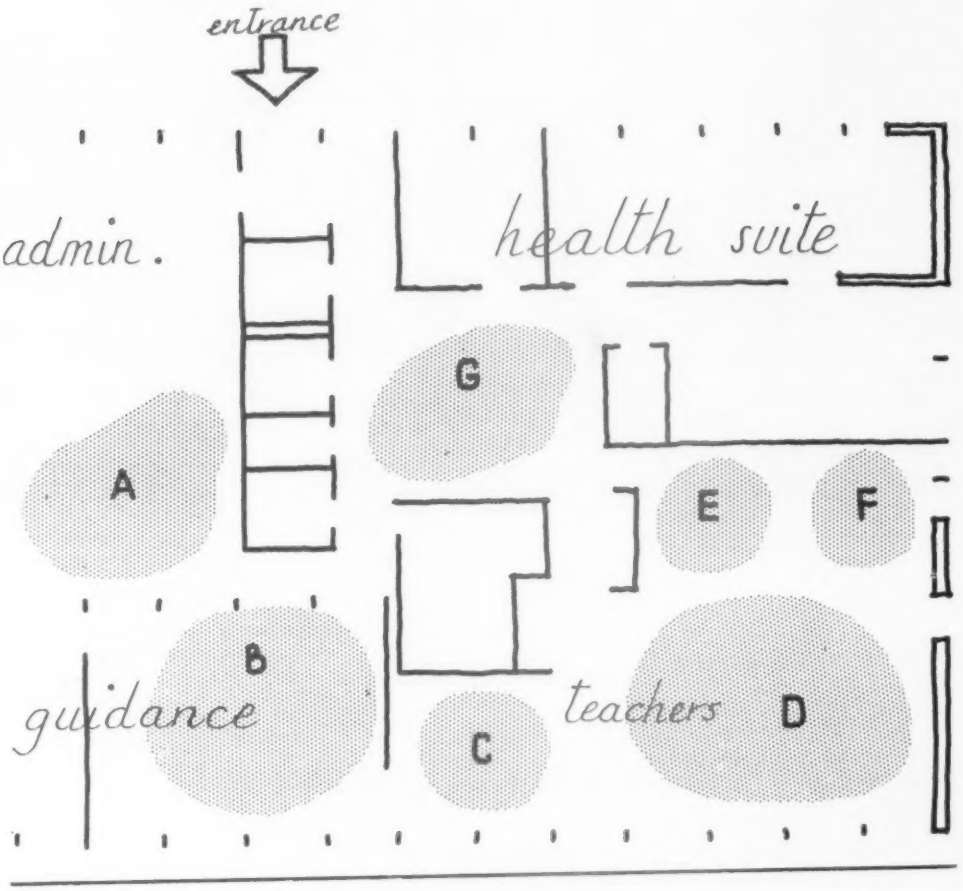
refuge while still maintaining integration with the rest of the school.

Included in this proposed arrangement would be seven separate work tables, storage units for the 40 teachers, a kitchenette, lounge furniture, magazine racks, a mimeograph machine and easy access to restroom facilities. The arrangement of this room should be deliberately flexible. If more privacy is desired, room dividers, bamboo screens or drapes may be used to separate the work area from other parts of the room. For meetings or social events these dividers may be detached and stored. The tables should be of a bistro type that can be put together for buffets, cards, PTA meetings, etc.

Once this refuge has been established, the teaching staff should be able to function far more efficiently, free from interruption and interference. In addition, this living center, because of its atmosphere and refinement, will provide a suitable place for teachers to bring visitors.

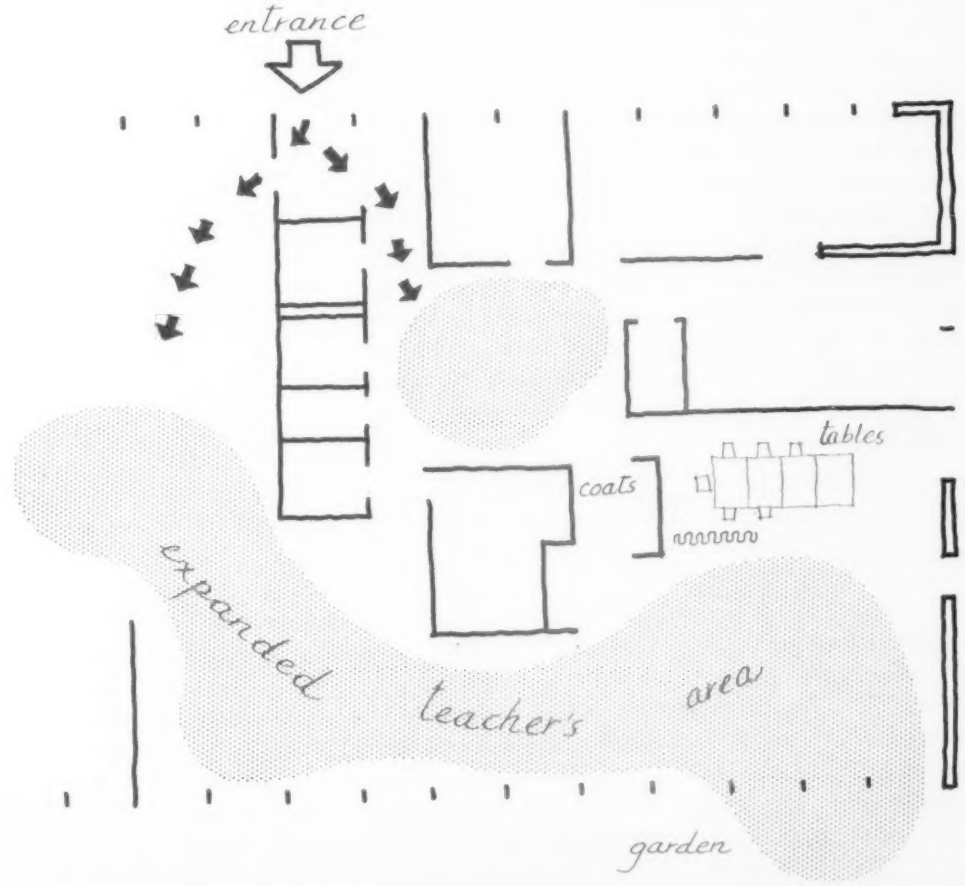
Cooperative Action Is Needed

The primary consideration in establishing any such location may well be that administrators, teachers and architects consult one another concerning what purpose and requirements the social living center must serve. With each secondary school the problem will have individual aspects. Only when these groups can coherently and specifically state their particular needs can they begin to make the community understand them. Since this is a project which will ultimately result in benefits to all concerned, it must be considered as a

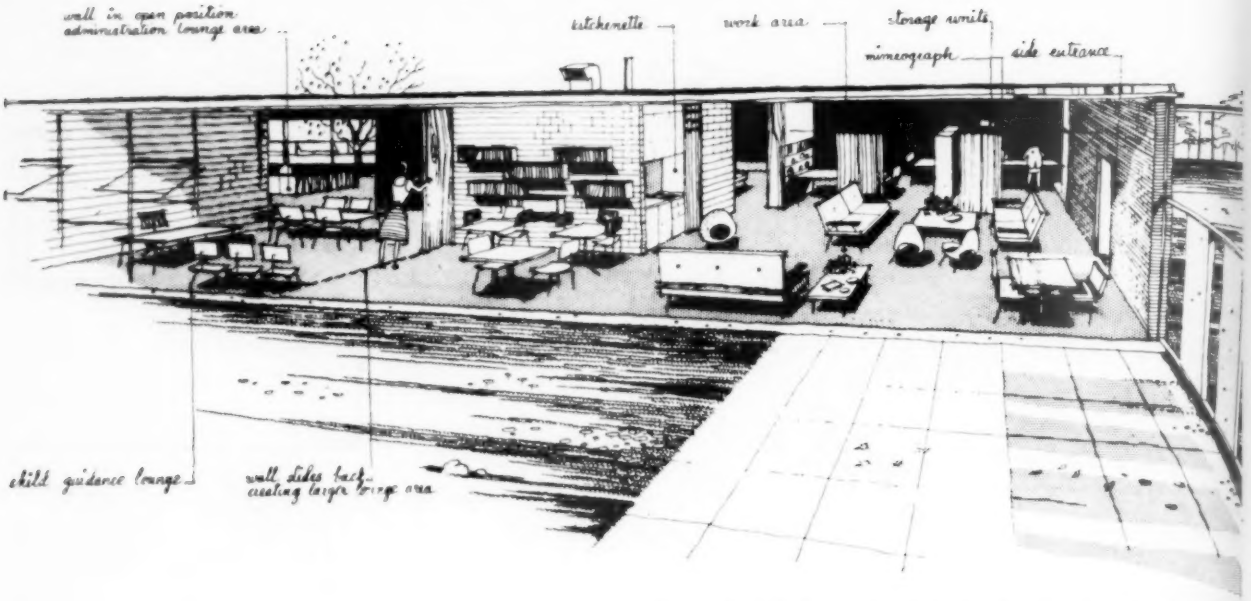


Basic plan for a teachers' living center. Areas are allotted in this way:

A. Administration
B. Child Guidance Waiting
C. Library Reading-Work Situation
D. Living Room
E. Mark Papers
F. Mimeo Exams
G. Health Waiting



The same basic plan can be expanded into one compact area for special functions by removing room dividers, partitions, screens and by rearranging the furniture.

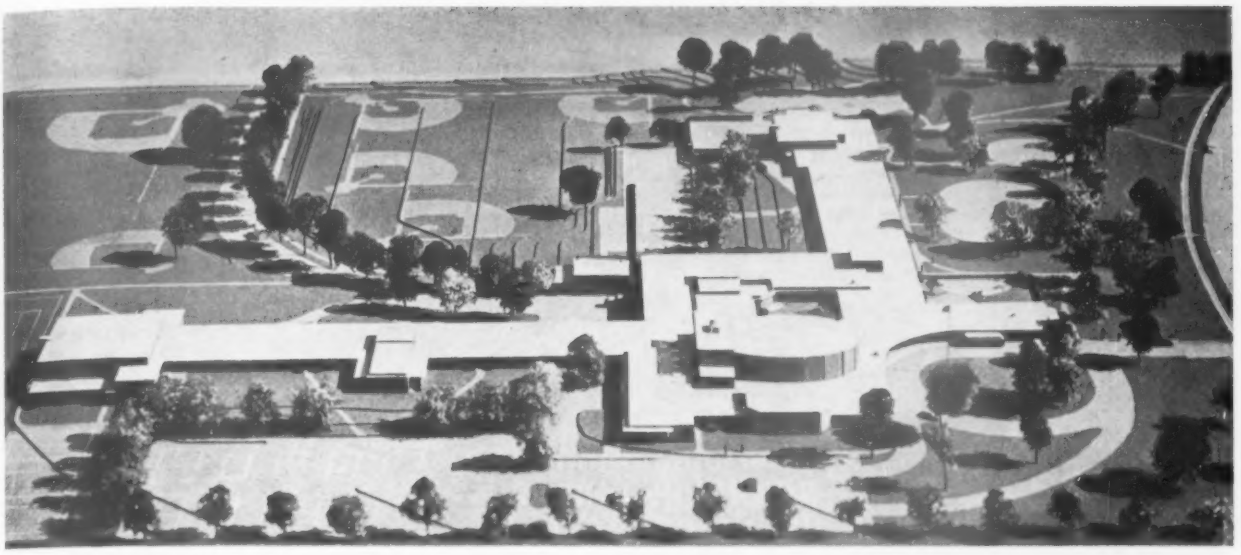


The teachers' living center at the Northport Senior High School is a compact multi-purpose room. The unusual interior decor makes it possible to expand the room for PTA meetings or buffets simply by sliding the wall panels back into the base. If privacy and quiet are desired, these sliding panels separate workrooms and discussion areas.

community problem to be confronted and solved through cooperative action.

An enlightened community produces better teachers, better schools and better citizens. In Darien, Connecticut, before construction was begun on a new school, the community (school board, teachers, architect and public) was exposed to a long-range public relations program designed to explain the procedures of modern school planning. The result was that the educational program has been fully met as far as physical requirements are concerned, and at a lower cost than the original estimate.

Meeting the budget did not mean neglecting the teachers. Close cooperation on the part of the Darien group made this possible without neglecting faculty or students. This was the result of the entire group not only working together, but thinking along the same broad lines. What has been done in Darien can be done in YOUR school.



King Philip Drive School, West Hartford, Connecticut. Ebbets-Frid-Prentice are the architects. The building, on a 40-acre site, will accommodate 1,700 elementary and junior high school students.

THE PLANNING REQUIREMENTS OF LARGER SCHOOL SITES



by CHARLES A. CURRIER

Charles A. Currier and Associates, Land Planning Consultants, West Hartford, Connecticut

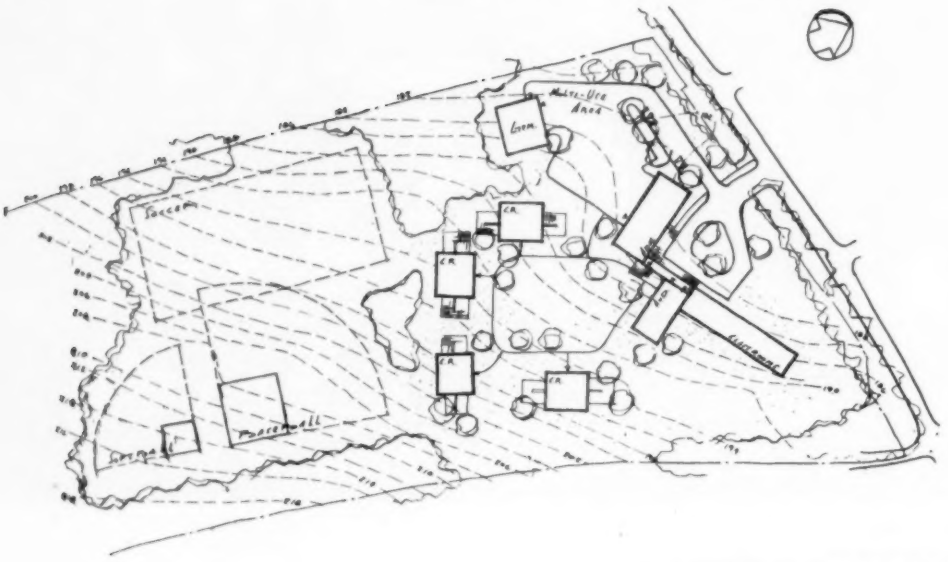
Charles A. Currier received his Bachelor of Science degree from Boston University and a Master of Landscape Architecture degree from Harvard University. In 1939 Harvard University awarded him the Charles Eliot Traveling Fellowship. During 1947–48 he studied in Rome as a fellow of the American Academy. Mr. Currier has maintained his own practice since 1940.

EACH parcel of land possesses intrinsic characteristics. Each kind of school requires a related group of site facilities. These principles have always guided the site planner in his work. However, today's trend toward larger school sites maximizes the importance of a complete site analysis to obtain the greatest educational value from any given site.

To a great extent the disposition of the site is dictated by topography and other natural features. Neighborhood environment and relationship to centers of school population may render some portions of a site more desirable for educational purposes than others. The kinds of site improvements depend on the school plant involved. Elementary grades, for instance, require more paved play areas and fewer playfields than do secondary grades. The addition of an auditorium or a gymnasium to a basic scheme presupposes ample auto parking.

An Actual Case

To illustrate the kind of reasoning used in analyzing large scale sites, let us consider an actual case. The problem concerns an elementary school to be built on 25 acres of long, narrow hillside and to include an auditorium, a gymnasium and a cafeteria. The general scheme is a unit plan, and the school is the Wilbert Snow School, Middletown, Connecticut, Warren H. Ashley, architect.



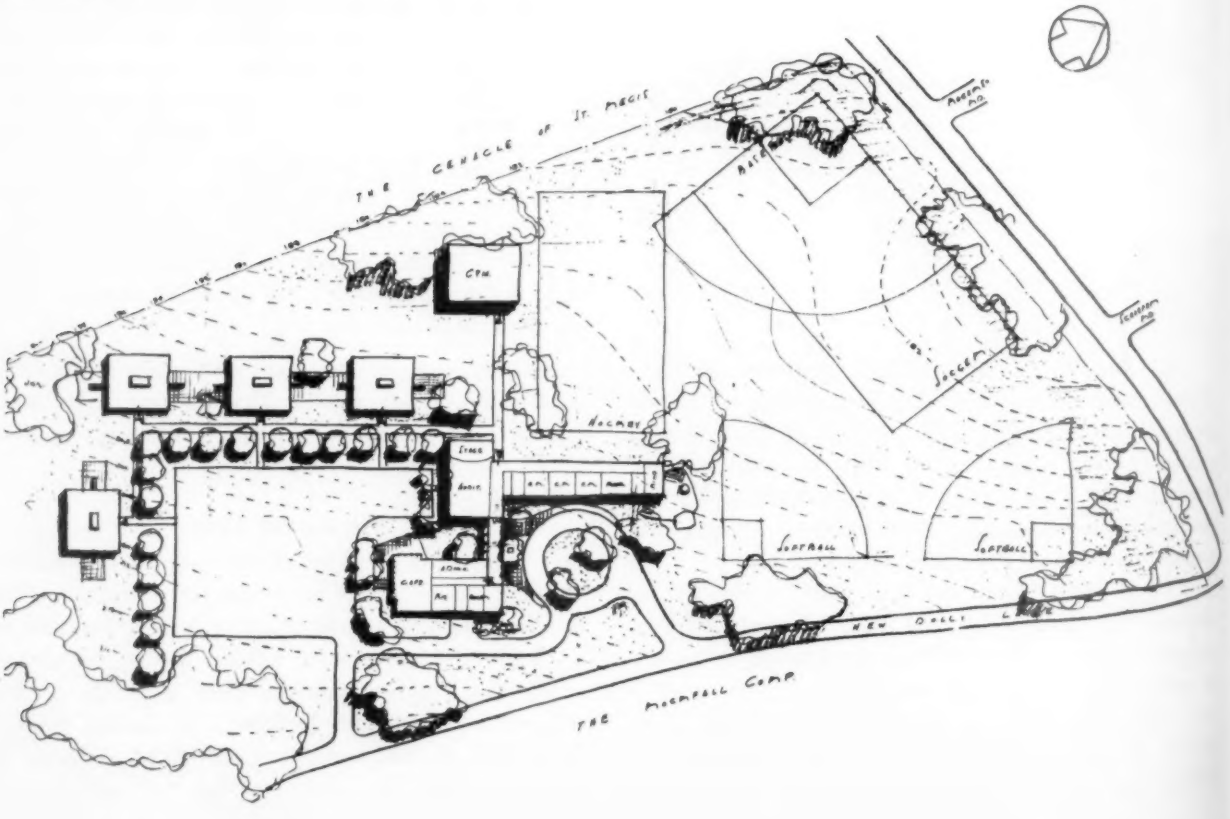
Preliminary and final plot plans of the Wilbert Snow Elementary School, Middletown, Connecticut, are presented on these two pages. Warren H. Ashley, architect.

Pro: **Locating the school plant adjacent to the highway allows easy access from the street and good visibility of the structure to townsfolk passing the site. At the outset the school committee favored this location. The land slopes diagonally toward the street from southeast to northwest in such a manner that it flattens out near the highway to provide an easy grade for placing the structures.**

Con: The uphill portion of the site is heavily wooded with large trees. To create playfields in this area would destroy the natural character of the site and would restrict future expansion of the unit scheme to the lower area which is already heavily built-up.

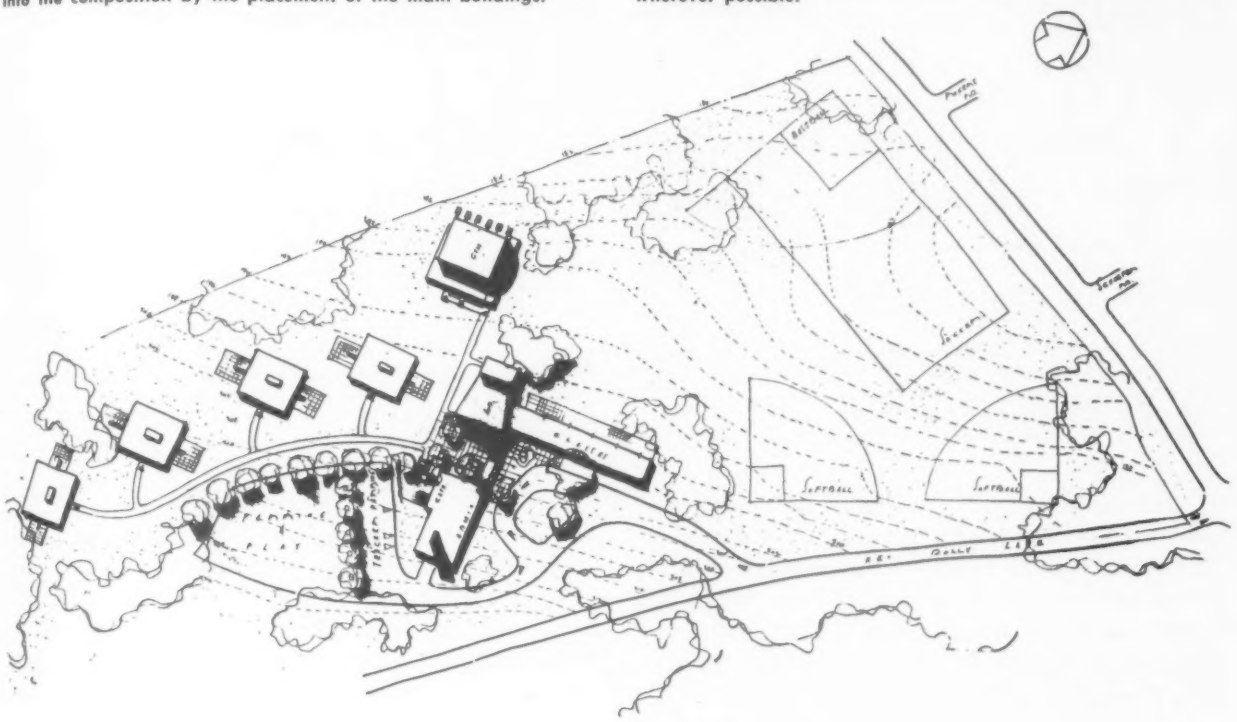
Pro: **Free-standing, "campus" classroom units are readily adaptable to the steeper slope, thus leaving the flatter area for playfields. This change removes the study area from distractions on the busy road and provides a buffer area of fields and planting.**

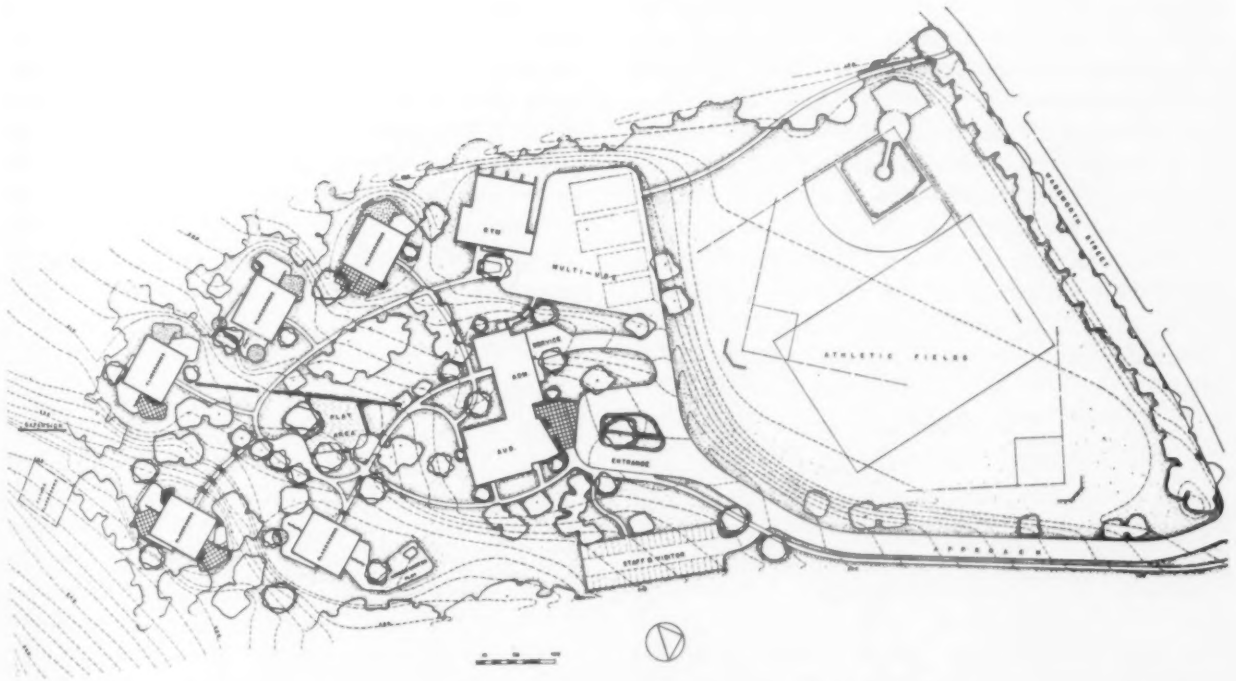
Con: This rigid, rectangular pattern does not achieve the park-like feeling suggested by the site. The paved play and parking area requires considerable cross-slope grading, making it impossible to save many trees.



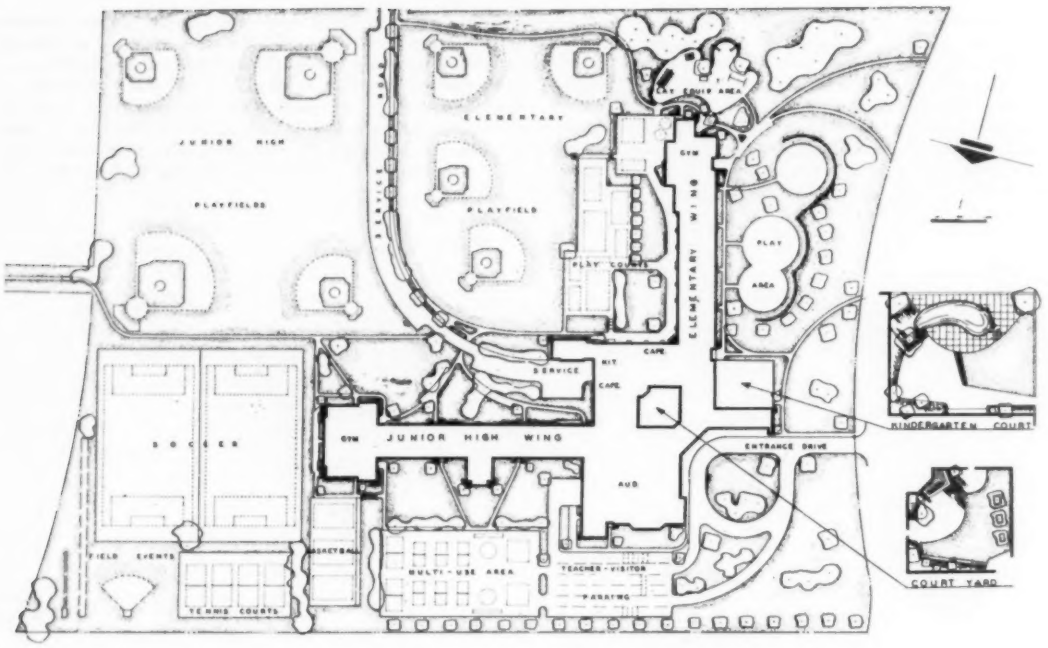
Pro: This scheme begins to recognize the site's native character. It requires less clearing and grading. Because of the natural change in grade, the classroom units assume individuality when located freely across the slope. The out-door class play areas no longer abut each other directly. Some separation is accomplished between the paved play and teacher parking areas. This plan presents the most pleasant approach to the campus thus far developed. Upon arriving at the school, one is drawn immediately into the composition by the placement of the main buildings.

Con: The units become progressively less related to the common buildings. The steep cross-slope of the site imposes a difficult grade relationship between the administration and the auditorium, which requires either excessive earth cut around the administration or high foundations under the auditorium. The plan would be improved if all daytime auto traffic were removed from the campus area. However, the principle of combining day play with night parking is an economical measure which should be employed wherever possible.





This final scheme, as actually built, achieves the free, park-like, campus arrangement suggested by the site and satisfies the specific requirements of the educational program involved. Arranging the units in a generous loop effects a unity of pedestrian circulation missing in the other schemes, and frees the central wooded area for unorganized play and nature study. By moving the organized play yard to the gymnasium area, the amount of grading necessary in the study area is reduced to a minimum. The complete separation of daytime auto traffic from the study area is hereby accomplished. Staff cars are drawn off to their special parking area before they reach the main turnaround, thus allowing uncongested discharge and loading of students. Service traffic by-passes the main approach point and is directed to the building before it reaches the paved play area.



Site plot plan of King Philip Drive School, West Hartford, Connecticut. Ebbets-Frid-Prentice, architects.

Having considered some problems which arose from complex site conditions on a rather simple elementary installation, let us now look at a forty-acre site all of which must be developed to accommodate 1,700 students on the elementary and and junior high levels. The school is the King Philip Drive School, West Hartford, Connecticut, Ebbets-Frid-Prentice, architects.

An ample approach road allows transported students to be loaded and unloaded away from busy street traffic. The generous scale of the turn-around is a safety factor anticipating heavy auto usage. North of the building a daytime parking facility for 80 staff cars and 10 visitors is provided. Connected to this parking lot is a multi-purpose area designed for various court games. Should extra parking be needed in conjunction with the auditorium or gymnasium, the net posts are removed from their sockets and brass plugs are put in place. When converted, this area parks over 100 cars. Eighty-six parking spaces are also available along the service drive for school personnel and spectators at field events.

Outdoor Areas

The service drive divides the extensive junior high fields from the intensive play areas of the lower grades. The specialized elementary areas cluster around the south wing of the building adjacent to their related classrooms. Kindergarten children have their world of sand boxes and slides protected from the onslaughts of older students. Grades one through three play on 100-foot platters of black top, west of the building. The fourth, fifth and sixth grader wants regular-shaped hard surfaced areas for basketball, paddle tennis, volleyball, shuffleboard and tether tennis near his study rooms, east of the building. Both groups use a common play equipment area where four inches of medium-weight river silt, similar to that used in baseball skinned areas, is provided to prevent bruised knees. Playfields for these younger pupils are restricted to softball.

Junior high facilities relate more to the gymnasium than to the classrooms. The multi-purpose area mentioned above can be used for paddle tennis, volleyball, badminton, shuffleboard, tether tennis and "indoor" baseball. Although tennis and basketball are handled separately in this particular scheme, they also may be included in the multi-purpose area if economics so dictate. Besides soccer, little league and regular baseball, the playfields include track events: broad jump, high jump and 100-yard dash.

Summary

The two examples we have considered represent extremes. On the one hand, adequate utilization of the site and preservation of the native characteristics were of major concern. On the other, natural features were of little consequence. Because of the requirements of the latter program, the land was highly developed for functional activities. Studying today's larger school sites, the site planner encounters both phases of the problem to varying degrees. His solutions are aimed at attaining the utmost in educational value from the site.

PROMISING PRACTICES IN THE EDUCATIONAL PLANNING OF NEW COLLEGE BUILDINGS



by HARVEY H. DAVIS

Provost, State University of Iowa, Iowa City, Iowa

Dr. Davis received his B.A., M.A. and Ph.D. degrees from the University of Iowa. His public school experience was gained in Iowa, Illinois, Missouri and the State Department of Education in Ohio. Dr. Davis spent twenty years at Ohio State, serving successively as professor, chairman of the Department of Education and Vice-President.



and LESLIE G. MOELLER

Director, School of Journalism, State University of Iowa

Professor Moeller graduated from the School of Journalism at the State University of Iowa. After experience on Iowa weekly newspapers, including management and ownership, and two years as a naval air combat intelligence officer, he joined the school's faculty in 1946 as head of the bureau of newspaper service. Professor Moeller was named director of the School of Journalism in 1947.

UNIVERSITIES generally are very long-lived institutions and survive major changes in the government and other practices of the societies which support them. Such universities as Oxford, the Sorbonne and Bologna in Europe, and Harvard, William and Mary and Yale in America are cases in point.

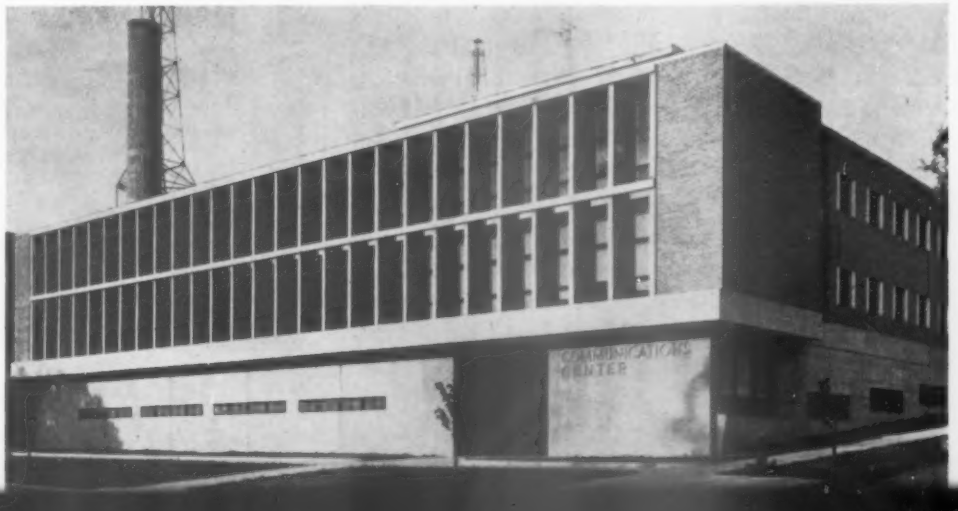
Survival is possible because universities are needed by all forms of society and because they change as the needs of their societies change. The changes in universities lag somewhat behind those in society and are less extreme but conform in general. Programs of teaching, research and service are, therefore, normally in a state of expansion in some areas and of contraction in others, with the expansion more prominent than the contraction. Changes in program mean changes in physical plant both in modification of old buildings and construction of new, for the modern educational plant is designed to further the educational program rather than as an architectural exhibit.

The faculty of the university is the main source of the changes in program and should have an appropriate part in the planning of buildings to serve the changed programs. It is the purpose of this article to present some account of the way in which the faculty participated in planning for a new building, the Communications Center at the State University of Iowa.

Great Problem of Society

One of the great problems of any society is communication among its members. In spite of the vast improvement in the means of communication, modern civilization is still plagued by problems in this area. Particularly is it concerned about the best use of the mass media in this respect. Journalism, radio, the motion picture and television all present great possibilities for use or misuse.

The faculty and administration of the University of Iowa were aware of this problem and were also aware of the responsibility of the university for aiding in its solution. In the language of one of the faculty committee reports, "The university has an obligation . . . (a) to disseminate information; (b) to train disseminators of in-



Unit One of the new Communications Center at the State University of Iowa. Vertical concrete fins are used for sun control and allow floor-to-ceiling windows.

formation; (c) to study what has been shown to be the *art* of communication."

First Steps in Planning

To obtain a consensus of faculty and administrative judgment on the matter, President Virgil M. Hancher named a communications council, made up of faculty representatives from the various mass communications fields. After extensive discussion of the philosophical aspects, the council determined that university units having to do with journalism, radio and television should be related in building as well as other ways, and that all should be near the library, one of the major instruments of mass communication. The council



Air-movement duct is intentionally exposed in the belief that functional materials are also decorative. Acoustic ceiling tile is attached directly to the underside of the floor slab above.

and the campus planning committee went to work on the problem of location and general structure. The first plan produced provided for housing radio, television and journalism together in a building planned so that it could be constructed in three units, and also for relating them to the library and to the engineering area as service agencies of major importance.

The timing of building projects is a responsibility of administration and is subject to pressures of needs of various sorts and to fiscal policies. In this case it was the decision of the university president that the first unit to be built should house the School of Journalism. Accordingly the university architect and the faculty of the School of Journalism were asked to proceed with planning for this unit in conjunction with the firm of architects, Brooks and Borg of Des Moines, designated by the state board of education for the drawing up of detailed blueprints and specifications.

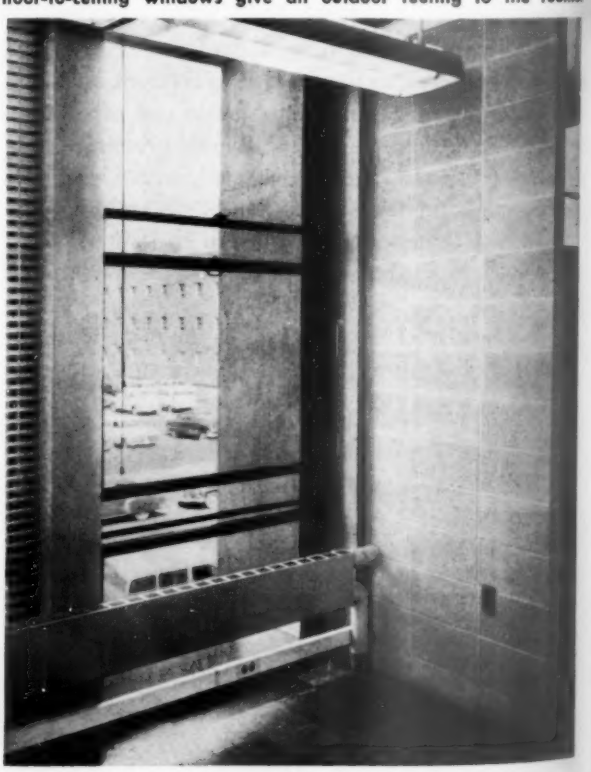
The communications council had set forth a statement of philosophy for the Center, based on the university's extensive experience in teaching, research and service in radio, in audio-visual and in journalism, and on the expected program in television, as well as on the presence of a highly developed library system. The journalism faculty had contributed directly to the development of this statement of philosophy, and the statement then became a logical starting point for its work on the detailed plans for Unit One of the Communications Center.

This statement called for the interassociation throughout of the various mass media on the ground of an extensive community of interest and a joint area of basic social concern. The journalism faculty was already well based in this area through having worked on the development of a program for the Ph.D. degree in mass communications, and through working with a number of candidates for this degree. This community of interest and of concern for relations with other areas of the university was then a major initial factor in planning activity.

The journalism faculty had already participated over a period of many months in preliminary planning of the entire center, which had been carried on to the point of determining the approximate size and location of all rooms in the structure. Now the faculty was faced with the need to make much more detailed plans and descriptions for the areas to be contained in Unit One, with an overall allocation of $525,000.

Before considering the details of the planning method, it may be helpful to consider some of the

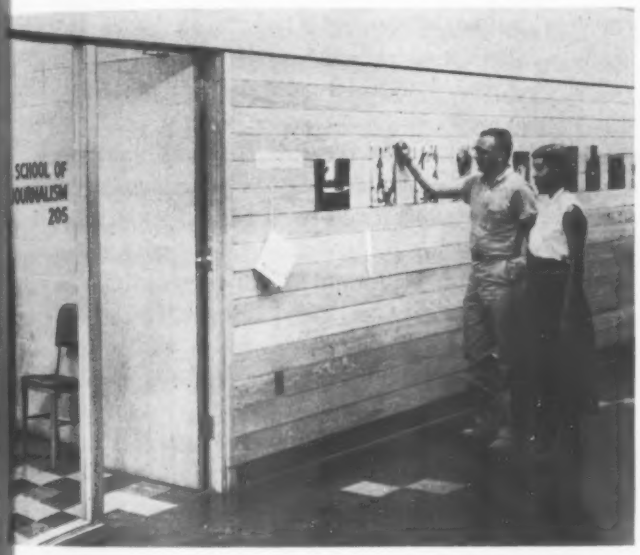
Partition wall is of cinder block. Horizontal conduit just above the floor provides electrical outlets below hot water radiator. The floor-to-ceiling windows give an outdoor feeling to the rooms.



many factors which determined the conditions under which the planning was carried on, and which a faculty should understand rather well early in the planning process. These factors can be divided very roughly into two groups (not necessarily clear-cut and perhaps to some extent overlapping): the relatively rigid or unchangeable factors; and those relatively less rigid and in part (or completely) changeable.

The "rigid" factors include site, climate, space required for utilities, corridors, stairs, receiving area, toilets and janitors' spaces; the need to provide for such services as light, heat, gas, water and power; legal requirements; adjacent buildings; and, in many instances, the amount of money available.

Among the relatively controllable factors are: space needs for various areas; the location of these



Oak truck flooring is used for one wall of this second-floor corridor in the Communications Center. The wall is used for displays.

areas; the architect's concepts; structural concepts; materials; special physical factors (ceiling heights in special-use areas, sound control); general instructional requirements (audio-visual in classrooms); certain specialized educational concepts (need to facilitate and encourage out-of-class contact between students and faculty); and the flexibility of mind of occupants of the building, so far as willingness to compromise and to accept new ideas is concerned.

Many of these factors will of course interact, and under different circumstances the degree of impact of the factors will vary considerably. Here is a summary of some of the possible impacts:

Site: this factor may have extensive effects in addition to limitations of area. In the case of the Communications Center, the long-range plan called for use of a site half a city block wide and a block long, with the upper end of the site approximately 40 feet higher than the lower which was to be the location for Unit One. A part of the impact of this situation is hinted at in this statement of our architect, J. Wayland Brooks of the firm of Brooks and Borg, Des Moines, very early in our process of planning Unit One: "We will plan a long, simple, direct building, anchored into the hill at the east." Again, the slope of the site resulted in windows high in the wall on much of the south side of the first floor of the building.

Climate: anticipation of the normal southern Iowa winter and summer temperature and weather influenced lobby and entrance planning and also the location of certain areas, and encouraged our use of sunshade fins on the west face of the building.

Space for service areas: space needed for entrances, corridors, stairs, toilets, material-reception and janitor service usually accounts for about 15 percent of floor area, although special situations may vary this figure. (In addition, it should be pointed out that the usable floor area in an 80 feet by 140 feet building is less than 11,200 square feet because walls and partitions must be provided for.)

Space for utilities: space must be provided for services for electricity, telephone, heat, water, gas, waste disposal, air movement or air conditioning and other needs such as compressed air or water temperature control in special-use areas (photography laboratories). The minimum needs are quite rigid; otherwise there is some degree of flexibility. Placing of electrical conduits, heating supply pipes, water lines, rather bulky telephone relay boxes (preferably not too high on a wall), sewage pipes and fire-fighting equipment is often rather inflexible. Air-movement pipes take considerable space and fans are very bulky. Unusual electrical power needs influence conduit location and often tie up wall space. Typical question: should water-temperature control equipment be located near point of use or at some relatively distant point where space is less at a premium?

Funds available: at some point in planning, the amount of money available becomes fixed and planning must be against this total.

Legal requirements: legal requirements on number of stairways and fire escapes and requirements on fire safety in stair wells are examples.

Adjacent building: an adjacent building obviously affects natural light and ventilation, and may also influence such factors as access. In our case we must eventually bring large trucks of newsprint into the alley north of our building. The fact that another building has been built flush to the north side of this alley has made it necessary to shorten our building to provide the necessary effective alley width.

Space Needs of the Areas

Space needs in various areas: these are in part rigid ("we must have a classroom to seat 80") but often are flexible. For example, our student newspaper office

was made somewhat smaller than at first seemed desirable, and all office partitions were omitted to conserve space and reduce costs. Again, we had hoped for a four-story structure but, before taking bids, worked out an alternate three-story design. When only a three-story structure was found feasible, omission of one major related but less essential area (the university Department of Publications) produced a workable compromise.

Need for grouping areas: it may be essential or highly desirable that certain rooms or groups of rooms be adjacent. In our case it was desirable to have the student newspaper, the student magazine and the student yearbook all grouped around a central reference library to which all three units would have direct access. The offices of yearbook and magazine advisors are located near the offices of those publications. Certain interesting questions arise in connection with "adjacency"; for example, should offices of faculty members be located adjacent to or relatively near laboratory areas with which they are concerned? Or is it better to have these offices separate from laboratories? Our conclusion: except in cases where very frequent access is needed, the matter of "office adjacency" is not critical.



A wide window separates the studio and the control booth of the radio recording laboratory. The area is completely soundproofed.

Need for specific locations: it may be highly desirable to locate a unit in a given area for any one of many reasons; for example, the administrative area probably should be centrally located rather near the main entrance, and on a lower floor. Again, placement of high-traffic rooms, such as classrooms on upper floors, will require special attention to flow of traffic and may influence stairway design. A work area to which many callers come, such as our student newspaper office, might well be placed near the entrance and on a lower floor. If added units for the building are planned, this factor may help determine certain locations; our newspaper production and photography laboratories and the reference library are placed so they can be expanded into the future Unit Two.

Architectural concepts: our architect suggested and we willingly accepted a contemporary approach to design which uses pronounced continuous vertical concrete fins on the upper floors of the west front of the building. This approach made possible floor-to-ceiling windows, each measuring 4 feet by 10 feet. Varied impacts were felt from this design approach. For example, such windows provide excellent natural light, but also create special needs for adequately darkening a room for audio-visual purposes in mid-afternoon. And even though the fins stop much sunlight, the huge glass area admits much heat of a summer afternoon.

Mr. Brooks was interested also in using monolithic concrete for the first-story walls of the building, and was desirous of getting a large wall surface with as little interruption as possible. This resulted in the use of long, thin horizontal windows in the first-floor wall of the west face.

Structural concepts: the overall size of our building, 80 by 140 feet, produced a design in which concrete supporting columns were spaced on 20-foot centers; it was essential to maintain this spacing on all three floors (when the fourth floor is constructed some variation may be possible). This "20 by 20" factor was influential in determining room location and size. In practice, a 10-by-20 unit was often the basis for planning, although multiples of 20 by 20 or a combination of 20 by 20 plus 10 by 20 was also used. Early knowledge of such a controlling factor in design and recognition of its force proved very important.

Internal Flexibility

The Brooks' application of this design had other impacts also; the columns on 20-foot centers produced a structure in which the walls, both external and internal, carry no load except their own weight. This provides for a very high degree of future internal flexibility and to some degree met our early hope for a modular type of construction. At the same time, in our own immediate case (although this would not always follow), the design produced a concrete floor slab with an unbroken flat underside which made the ceiling for the room below with no additional finishing.

Materials used: in the Communications Center materials are often handled so they provide or add to the decorative effect. The east and north walls of the second and third floor corridors and the east and west walls of stairwells are of ordinary building brick laid in block bond (bricks do not overlap) and unfinished. Exposed concrete in window fins is also left unfinished. The colors of the brick and concrete then help determine paint colors throughout the building.

Cinder blocks, light in weight, fast to lay and of

pleasing texture, are used in a single thickness without overlap for many partition walls; they are effective and attractive but under some conditions they transmit sound all too well and special corrective steps are needed. On our first floor we are using temporary partition walls (when Unit Two is built, we shall use the area for the student daily's mechanical department), and these present sound-transmission problems which cannot perhaps be fully anticipated before occupancy. The use of folding partition walls will also require comparable special planning.

Oak truck flooring laid horizontally is used on the west and south walls of the second and third floor corridors. This pleasant, warm, easy-to-maintain wall also provides a built-in display surface which has already carried an exhibit of more than 200 large mounted photographs.

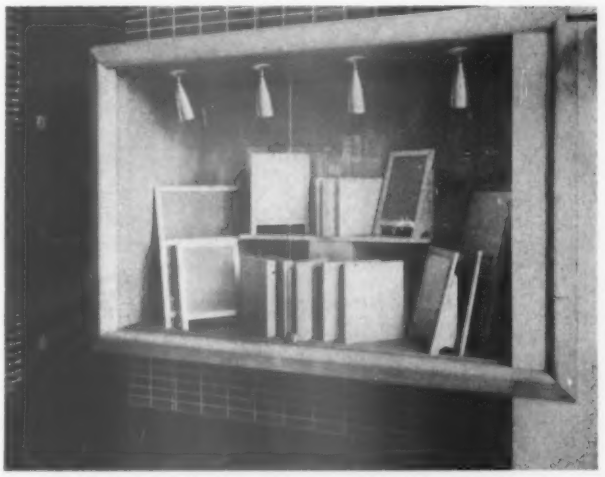
Plaster is used as a wall finish only in the first floor main lobby (although plaster board is used effectively on the reverse side of the oak-flooring wall); this factor was very helpful in reducing cost. The character of floors also influences construction and maintenance costs; many of our floors are asphalt tile, but we are finding properly sealed concrete satisfactory in other areas where the sound-reflecting qualities of concrete are not too troublesome.

Desired Features

Desired physical and service features: certain areas and programs may require special physical conditions. For example, the student daily mechanical department is to be housed eventually on the first floor of the Communications Center, so ceilings are somewhat higher than usual and a special access door for large equipment has been installed. Adequate space for storage (we have found our needs to be somewhat greater than anticipated) and for receiving supplies and equipment is also needed.

Are there demands for special physical characteristics in certain units? For example, we needed acoustical ceilings in our secretarial area, in the Daily Iowan workroom and in certain other much used rooms with a relatively high continuous noise level, such as our newspaper production laboratory. Another example would be special needs for ventilation, as in the case of a number of our small photography darkrooms.

Many service-facility details must also be checked. How many phones are needed, where should they be located, and what provision should be made for additional phones? Our experience indicates that wall conduit outlets should be provided on at least two walls, preferably opposed, in faculty offices and that one or more outlets should also be provided in such rooms as classrooms, looking ahead to future changes in use. In planning telephone installations, advice is usually available without cost from telephone companies. Is



Raised display case in main lobby of Unit One of the Communications Center. The two lobby walls are of ordinary building brick.

an intercom system needed in certain areas, and does this call for under-the-floor conduits? Are inter-connected telephones needed? What provisions should be made for other under-the-floor or in-the-wall conduits?

Will television reception be important in the building? Even if it is not now, perhaps it will be in the future. In that case, wall and floor conduits, probably in much greater quantity than might at first be apparent, should be provided.

We found it desirable to have many electrical outlets. A minimum of two outlets (four openings) in small rooms is not too great, and in larger rooms spacing of outlets on approximate 8-foot intervals seemed a minimum installation. Each standing column within a room should have at least one outlet. On the walls of our building with floor-to-ceiling windows "plug-strip," a continuous horizontal metal conduit with outlets at 5-foot intervals about 6 inches above the floor, has been very effective.

This kitchenette unit is located in the student-faculty lounge. In planning the area provisions were made for adequate electric conduits, hot and cold water and waste disposal.



Placing an adequate number of electric outlets (literally, about twice as many as appear necessary) in the floor in various sections of administrative office areas is desirable in order to provide some flexibility in the location of office equipment. Floor outlets for telephones are also essential in such areas.

Have an adequate number of drinking fountains been provided? Because waste water must be disposed of, locations must be carefully planned well in advance. Should pay telephone booths be installed in corridors or lobbies? (This is at least a partial answer to the problem of non-institutional telephone calls.)

What display space is needed? How many bulletin boards are desired? Where should they be placed? Should they be protected with locking glass doors? Are



This student-faculty lounge provides an informal atmosphere for the out-of-class discussions of students and faculty. The kitchenette enclosure is in the left background, near the entrance.

larger and deeper display cases also needed? We decided to use such a large and deep display case in our main entrance lobby, in addition to both a first and second floor bulletin board for the usual notices and posters.

General Requirements

General instructional requirements: in classrooms, what special facilities for display and experimentation are needed? Is it desirable to have bulletin boards as well as chalkboards in classrooms and seminar rooms for the proper display of large visual materials?

Has adequate provision been made for audio-visual equipment? In our classroom, which seemed most suited for this purpose, a conduit to connect film projector with speaker has been provided beneath the floor of the room. Methods of darkening a room and of mounting screens either temporarily or permanently must also be kept in mind. Should special provisions be made for illuminating the students' area of the room so that they may take notes freely while observing material projected on a screen in the darkened forward portion of the room?

Specialized educational concepts: certain rather specialized approaches to education may also enter planning. For instance, we wanted to promote out-of-class interchange and discussion between faculty members and students and between students in our various sequences, so it seemed essential to have a student-faculty lounge set aside solely for this purpose.

Flexibility of mind: to what extent are the potential occupants of the building willing to accept new ideas in such a building? To what extent will they look for new ideas?

The needs of the future: what's happening now in the fields to be housed in the building? Is the area static or changing rapidly? (In mass communications, research activity is growing rapidly; we have ample space for much future expansion.) To what extent can the direction of change be predicted? (Originally we planned space for facsimile; later we dropped this area, mainly because of a decline in potentiality in the field.) If the direction of change can not be anticipated, what can be done to provide a structure which anticipates the certainty of change?

These, then, are some of the factors which influence the direction of planning. In practice, how can this planning be carried on effectively by the faculty and the administrator? Planning can well begin with a thorough examination of what the unit is doing and where it is going. Why do we have a School of Journalism? What function does it have? Will this function change? How does the school fit into the overall concept of the university, now and in the future, in the fields of teaching, research and service?

Help from Other Institutions

While this discussion of philosophy was going on, we found it helpful to obtain plans of other comparable buildings. We asked administrators now in these buildings for their comments and advice. Various faculty members wrote to associates in other institutions to ask detailed information on the planning of their own areas. On convention trips to other institutions arrangement of journalism areas was observed, and in many instances pictures were obtained of desirable special-use installations such as typing rooms and photo-journalism areas. Faculty members also took occasion, over a period of many months before planning began, to examine in use various construction items needed in the building. The university architect, Mr. George Horner,

provided many suggestions, answered many questions and directed us to source material of many kinds.

Before detailed planning begins certain policy decisions can probably be made. For example, will one, two, three or more faculty members be assigned to an office? What should be the minimum and optimum sizes for offices? What office space should be provided for non-teaching assistants aiding faculty members? After certain basic decisions of this type, it is possible to proceed with detailed statements of space needs. These schedules can be prepared by the faculty member in charge of each area. In our case this meant staff members in administration, advertising, media management, community journalism, editorial journalism, magazine journalism, newspaper production, pictorial journalism, public relations, radio journalism, student publications, television journalism and typography.

These faculty members were asked to describe in detail the needs in each room desired in the area for which the faculty member was responsible. (In some cases, of course, there was group action and occasionally discussion among two or three inter-related groups.)

In this detailed planning, specially prepared duplicated forms for describing rooms were found helpful. These forms asked this specific information on each room: (a) use, (b) preferable dimensions, including a statement of alternate dimensions; (c) equipment and furniture to be used; (d) need for inter-connecting doors; (e) need for storage space; (f) requirements in detail on all utilities including outlet locations; (g) bulletin and chalkboards, with sizes; (h) special facilities for visual aids; (i) other needs. In the special-use areas, a separate analysis was made of needs for electric power, gas, water, compressed air and so on.

Statements of Adjacency

Faculty members were asked also to give "statements of adjacency." Who needs to be near whom or what, and how urgent is the need? Answers were also obtained to the question: upon what floors must or is it desirable that certain units be located? These space and adjacency requests were then coordinated by a faculty committee and the director. Preliminary decisions were made on location by floor, and a statement of the most essential adjacency requirements was worked out. The totals on room space were checked against the preliminary estimate of available footage provided by the architect, and major adjustments in the sizes of different areas (and of some rooms) were made.

In this whole process a willingness to revise estimates of need proved essential. For example, originally in early planning it was believed desirable to have a dictation room in the administrative area, to which faculty members would go to dictate letters to electronic equipment. This plan was abandoned when it became apparent that it would be more efficient to locate dictating units in faculty offices. Were the building in the planning stage now, very probably a centralized telephone-type dictating system would be seriously considered; in that case provisions for conduits would be essential.



The newspaper production laboratory has a high floor loading specification for the heavy equipment needed here. Acoustic ceiling tile reduces the high noise level prevalent in this area.

Space Requirements Are Listed

This coordinate-and-compromise process resulted in a "Description of Space Requirements," a mimeographed listing of the detailed needs in each room in Unit One. This document opened with a summary of space needs by large areas and a statement of the relationship of these areas to the expected future construction pattern of the overall Center. A brief description of the function of each Unit One area and its operating needs was also included in the report.

In the descriptions of room needs which made up the remainder of the listing, rooms were grouped in areas, usually by use-pattern (for example, the photography laboratory area for pictorial journalism teaching). Each room was described separately, and the area in square feet extended to a column at the right of the page for easy totalling. Several copies of this description of space needs went to the architect as his basic working document. For obvious reasons his planning unavoidably resulted in suggestions for rearranging some areas, relocating others and making certain changes in the sizes of rooms.

During this period faculty and administrator must be prepared for numerous conferences with the architect, in person and by phone and letter, on readjusting faculty suggestions to fit the rigidities of space and other factors.

Checking the Plans

After the architect's preliminary plans were available, all faculty members were asked to check the plans

very carefully. For the process of checking it would be very helpful to give each faculty member a list of points to be covered. It is even more desirable for the administrator, who has probably been much closer to the overall planning, to go over the plans quarter-inch by quarter-inch to make certain that the end result accurately represents the preliminary discussion. This checkup should include such items as placement of telephone outlets, the position of hinges on doors, placement of light fixtures, location of air movement outlets, the types of glass used in doors and location of temperature-control thermostats.

The checkup is essential because minor difficulties in communications will almost certainly have developed in connection with such a great number of items, even though there has been much care in the interchange of information. Checking the plans at this particular time is very important from the standpoint of getting what is wanted into the building, and also for the purpose of keeping costs down. "Change orders" after construction has started can be expensive, and eventually a limit of tolerance is reached in the willingness of the institution's administration to permit further changes.

This need for careful checking applies also to the specifications for ventilation, electricity, plumbing, heating and all other services. Experience indicates that the specifications should be read carefully by the administrator and by all other persons directly concerned. In the process of faculty planning and checking, certain procedures proved very helpful. Frequent faculty meetings to report on progress and to exchange ideas and suggestions were highly productive. A constant interchange directly between faculty members in different areas also proved an effective way of circulating new approaches and new ideas.

An important problem was that of trying to "see" and "feel" the finished rooms. Drawing lines or writing words on paper does not give much sense of actuality, we learned, and a very conscious effort was needed to get the ideas off the paper and into some relatively real but still imagined structure of concrete and block, wood and glass.

In this effort at "seeing" and "feeling," we found it helpful to work with rather large-scale informal drawings of our own, for both rooms and groups of rooms. The larger the scale of the drawing, the more effective the planning seemed to be. Carried on to a further logical extension, this approach might well result in drawing full-scale chalk outlines of equipment, or placing paper cutouts or templates, on the floor of any rather large room which might be available for such planning.

Scale models would also seem to be desirable, especially in those areas where equipment is to be used. Small models of office items such as desks, files, tables and bookcases can be purchased for use with room models, and industry is finding that the use of these models is very effective in getting the highest efficiency in planning.

As planning got under way, the need for an effective filing system became quickly apparent. Tremendous amounts of paper accumulated in the form of lists, descriptions, plans, borrowed blueprints, letters, photos, sketches and memoranda. Filing these promptly and logically and keeping a record of what was and was not completed was an important time-saving factor.

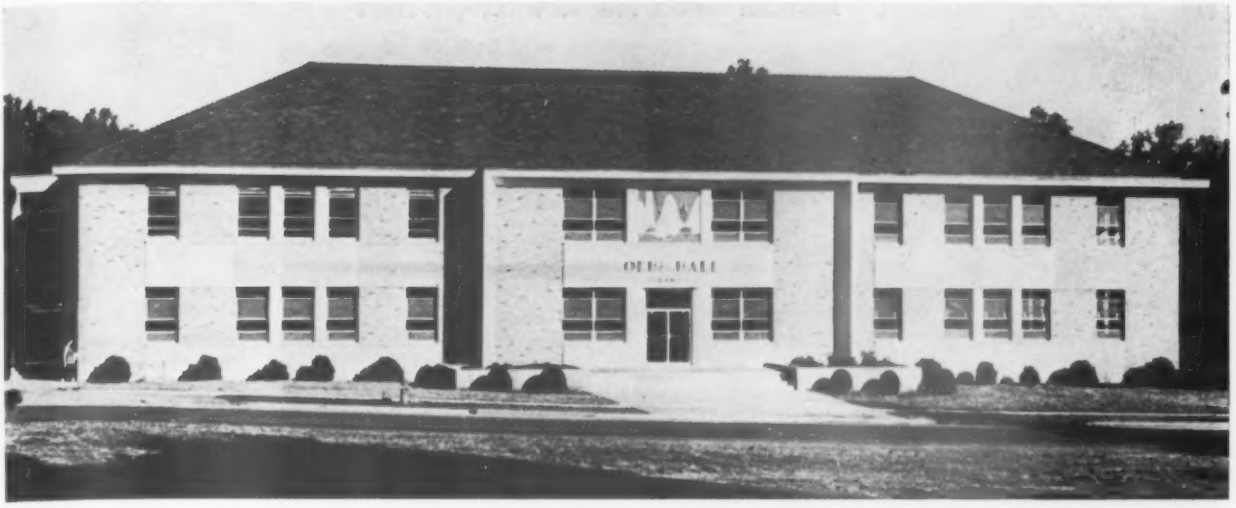
An arrangement for flat storage of large drawings proved desirable, especially because of the number of drawings needed. Large folders with good labels are very helpful in identification; construction of a temporary storage rack, with ten or twelve different horizontal compartments, is well worth while.

The Results of Faculty Planning

These rather mechanical approaches were not an end in themselves, but merely an effective supplement to the other essential planning steps—the effort to understand the place of the School of Journalism in the Communications Center and in the university as a whole; the program to bring all faculty members fully into the planning procedure; the maintaining of close and sympathetic contact with the architect; and the effort to acquire a flexible planning attitude and to keep very much in mind the long-range needs of the future.

What was the result of these faculty planning efforts? First of all, a satisfactory building. It is not perfect and there were mistakes, but these seem to be neither numerous nor serious. At the same time the building is highly effective in use, it is enjoyed by students and by faculty, the overall impact on visitors is pleasing to them and to us and we obtained a satisfactory amount of finished building for each dollar expended.

Beyond the achievement of the building itself, we find definite gains for the journalism faculty as a faculty —a gain in a sharper understanding of our own goals and those of the university, and still another gain in the development of a better mutual understanding and a stronger feeling of purpose within the faculty itself.



Olin Hall, the new Ceramic Engineering Building, is devoted to education, research and development in the field of ceramics.

CERAMIC ENGINEERING BUILDING AT CLEMSON COLLEGE



by G. C. ROBINSON

Head, Ceramic Engineering Department, The Clemson Agricultural College, Clemson, South Carolina

THE earth is a storehouse for ceramic raw materials, and these nonmetallic minerals constitute more than 80 percent of the Earth's crust. They provide our cheapest and most abundant mineral resource. The ceramic industry takes these raw materials and converts them with fire into useful products for man—products such as abrasives, refractories, glass, enamels, whitewares, cements and structural clays.

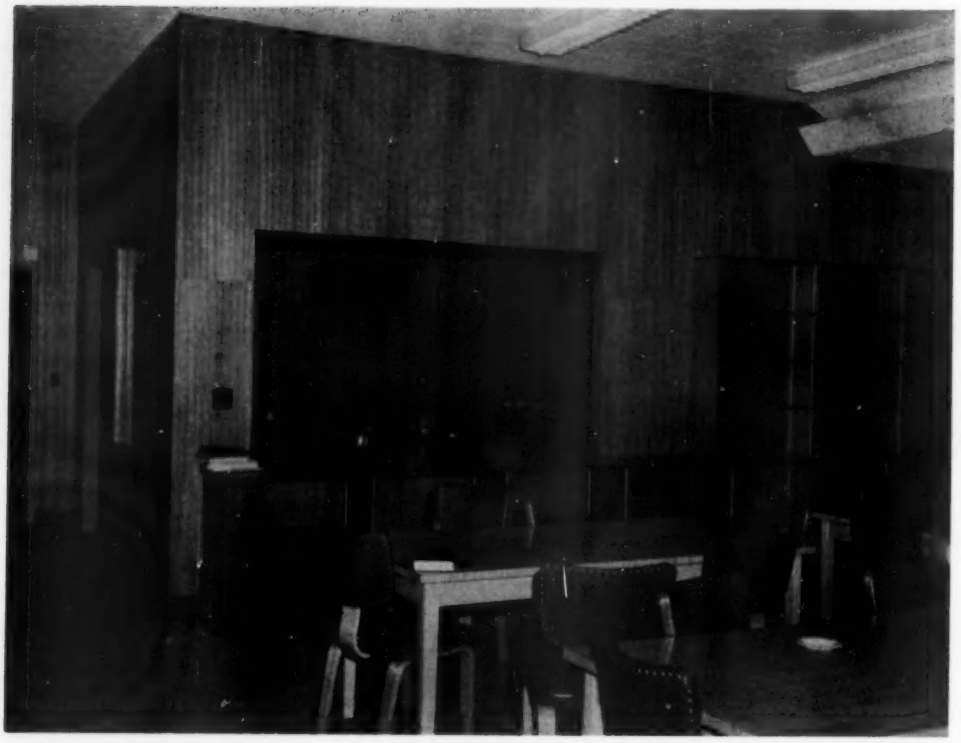
The F. W. Olin Ceramic Engineering Building of Clemson Agricultural College, Clemson, South Carolina, is devoted to education, research and development in the field of ceramics. Its laboratories and classrooms have been arranged in three groupings to serve this function: pilot laboratories; general laboratories and classrooms; and research laboratories.

Pilot Laboratories

The ground floor of the building contains laboratories that are useful in pilot plant development work and in the training of students in the unit processes of ceramic manufacture. Raw materials enter from the rear door and proceed to a crushing and grinding room where they can be reduced and screened to the proper size. Conveyors, feeders and elevators form an important part of the equipment in this laboratory. After size reduction, materials flow to a mineral dressing section where individual minerals can be separated from their mother rock and improved in quality. The pilot operation is continued with various raw material mixing equipment and forming equipment until the desired shape is produced. A continuous dryer-tunnel kiln combination completes the pilot operations. The main part of the pilot laboratory is a room measuring 50 feet by 60 feet by 22 feet high. A balcony at the half-way level of these rooms gives visitors an excellent viewpoint for observing the operations.

General Laboratories and Classrooms

All undergraduate laboratory classes can be conducted in rooms on the first floor of Olin Hall. The general laboratory and the kiln room are self-sufficient for the ceramic engineering student laboratories and



The library is situated on the second floor of Olin Hall. The library office has large vision panels separating it from the reading area.



Ceramic tiles cover the entire wall area of this research laboratory. Many colors are used to add beauty to the rooms. The floors are of quarry tile.

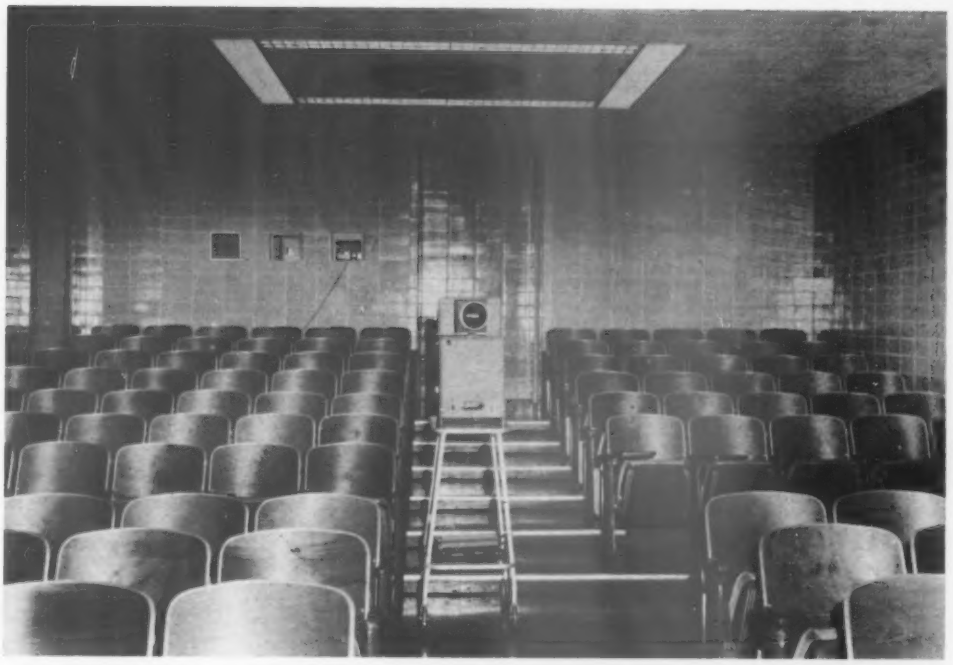
ceramic art laboratories. The general laboratory has ample work space and cabinet space and all table tops are of soapstone. Auxiliary areas from the general laboratory provide space for enamel, glass and whiteware laboratories.

The kiln room contains an assortment of furnaces capable of attaining temperatures up to 4,000° C. Heat sources of electricity, coal, oil and gas are used in order to give the student varied experiences. The types of furnaces vary from a rotary kiln for making Portland cement to a tank for producing glass fibers.

All classrooms are located on the second floor of the building. There are two classrooms of 30 seats and one lecture room of 130 seats. The lecture room is equipped with motor driven blackout shades to permit showing of movies. A projection booth complete with all types of projection equipment is available in the room. Soft upholstered seats and panel mounted fluorescent lights add to the luxury of this room. A design room and a library complete the general rooms available to students on the second floor.

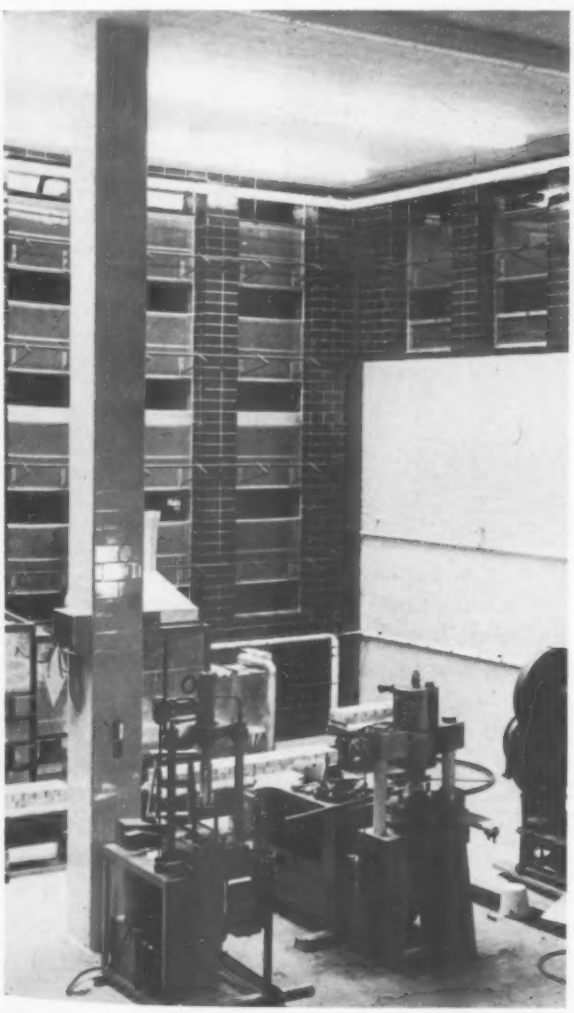
Research Laboratories

The principal research laboratories are located on



The lecture room has motor driven blackout shades to permit the use of audio-visual aids.

The pilot laboratories of the new building are useful in pilot plant development work and in the training of students in the unit processes of ceramic manufacture.



the second floor and include an electronic laboratory, a research analytical laboratory and a general research laboratory. The electronic laboratory contains a complete assortment of equipment for determining the electrical properties of matter. It includes ultrasonic generators, induction and dielectric heating equipment, and a complete line of temperature measuring and control equipment.

The research analytical laboratory contains an X-ray diffraction apparatus complete with wide range spectrometer goniometer and recording equipment, a double grating spectrograph with power source and reader and an electron microscope. Some of the many additional research instruments that are present include a Leitz Universal microscope, a Precision Interchemical viscometer, and a spectrophotometer.

Building Construction

Olin Hall is constructed of reinforced concrete and faced on the exterior with brick and limestone. Green roofing tile provides a beautiful top for the building. All windows are of the aluminum casement type.

The interiors of the laboratories and classrooms are finished in structural glazed tile of many colors. From the cool blue tile of the general laboratory to the brilliant red tile of the pilot laboratory, the beauty of the ceramic materials used in the building is enhanced by the color combinations found throughout. The floors of the laboratories are of quarry tile, while the classrooms and offices are finished with rubber tile squares. The ceiling surfaces are acoustical tile to provide excellent control even in the rooms with glazed tile walls. The

walls of the offices and library are of Philippine mahogany.

The lobby of the building has walls of peach colored travertine. A map of the state of South Carolina is made from vitreous tile, with different colors of the tile used to show the locations and spread of the various mineral deposits in the state.

The materials used in the construction of the building have provided a structure which requires extremely low maintenance costs. There is no paint on the exterior of the building and very little on the interior. The only combustible materials are the walls of the offices and classroom furniture. The rooms are exceptionally easy to keep clean. Floor drains in the laboratories permit hosing down of the walls and floors in these rooms.

The Olin Foundation of Minneapolis presented the building and equipment to Clemson College. Olin Hall was erected at a cost of $426,000 and contains 29,000 square feet of floor space. A separate grant of $180,000 was made by the Olin Foundation to equip the building. Dr. Charles L. Horn, president of the foundation, presided over the dedication of the building. Other officials of the Olin Foundation attending the dedication ceremony were Mr. James O. Wynn, vice-president, and Mr. Ralph Clark, secretary-treasurer. Dr. R. F. Poole, president of Clemson College, officially received the building for the college.

The building was planned and designed by college personnel. Professor John H. Gates was the architect, Dean J. H. Sams the engineer, and Professor Gilbert C. Robinson was the ceramic advisor. The building was constructed by the Daniel Construction Company of Greenville, South Carolina.



Lobby walls in Olin Hall are of peach colored travertine. Different colored tiles are used throughout the building.



The new General Library at Wayne University, Suren Pilafian, architect. A projected Memorial Mall will be located across from the library buildings and will be useful as an outdoor reading area.

WAYNE UNIVERSITY'S NEW LIBRARY BUILDINGS



by SUREN PILAFIAN

Architect, A.I.A., Detroit, Michigan

Mr. Pilafian was educated at New York and Columbia Universities. He obtained early experience in New York architects' offices and in Iran as a practicing architect. Mr. Pilafian has been practicing architecture in Detroit for the past thirteen years.

WAYNE University's new Library Buildings were planned to make their contents easily available to all users. To achieve a maximum degree of accessibility without overwhelming users with a large volume of material the Wayne Libraries were decentralized organically into five subject matter divisions. This arrangement permits an optimum degree of staff specialization and limits the scope of demands on the services of any one librarian.

There are actually five separate, almost self-contained libraries housed in two structures. All are unified by common general services. Each of the five divisions represents all material devoted to a broad subject classification, regardless of its form, nature of use or level of user. This arrangement of library materials in the Library Buildings was a new departure for Wayne University.

The Humanities Division contains all material on the subjects of philosophy, religion, languages, fine arts and literature. It occupies the entire second floor of the general library building and includes reserve books, non-reserve books, periodicals, reference books, pamphlets, documents, sheet music, recordings, microfilm and audio-visual material. The division has its own service core, seminar rooms, classrooms, research study areas, carrels, lockers, wardrobe racks for readers, music room with listening booths and necessary utilitarian services.

The Social Studies Division occupies the third floor and covers the subjects of history, geography, psychology, sociology, economics, home economics, social work, political science, nursing, business administration, anthropology and public administration. Also located here are collections of government documents, maps and newspapers.

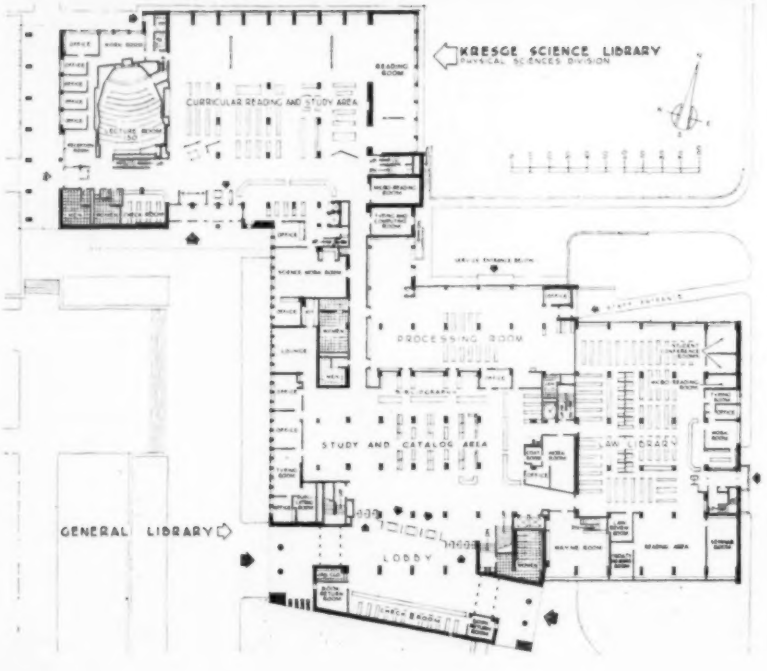
The Education Division, on the fourth floor, houses material for the fields of art, English, music and science

The Kresge Science Library is in a connected wing of the new General Library. It houses the Kresge-Hooker scientific collection.





The undergraduate reading area in the Kresge Science Library has a luminous ceiling with acoustic fins. Plastic dividing screens were later installed in the wood frames shown.



First floor plan of the Wayne University Libraries. Main areas include the law library, study and catalog area, a processing room, curricular reading room and a lecture room.

education, as well as recreation, library science, physical education, educational psychology, special education and vocational education.

The Science and Technology Division is in a separate but connected wing. It is separate only because it was built with funds received from the Kresge Foundation to house the Kresge-Hooker scientific collection. This division includes biology, chemistry, geology, mathematics, physics, pharmacy and all branches of engineering. Here also are a suite of offices and a lecture room for off-campus services related to the physical sciences.

The fifth division is the Law Library. This has been placed in the new building so that it is close to the old Law School which is adjoining. The medical library is not a part of these libraries, being situated at Wayne's medical center, located elsewhere in Detroit.

Common Services

Common services on the first floor consist of the entrance lobby, check rooms, information desk, central catalog, bibliography, circulation desk, acquisition and preparation offices, director's offices and staff lounge. In the basement there are the photographic suite, receiving and unpacking room, book repair room, archives, vault, general storage spaces and mechanical equipment.

The Wayne Room, on the first floor, is a special unit which houses material with particular application to Wayne University, such as university publications,

faculty reprints and the minutes of the meetings of the Detroit Board of Education (Wayne's governing body).

Plan Organization

Within three of these broad major subject divisions–humanities, social studies, science and technology –the material is organized on a use basis with the spaces divided into three zones–an undergraduate reading-study area, a research stack area and a central service core.

In the Education Division there is no distinction made between graduate and undergraduate usage. Almost all the material is active material, arranged in open stacks and organized according to general use. This division also contains listening-viewing rooms for the study of audio-visual teaching materials, and classrooms located near the juvenile and curricular collections for classes using such library materials frequently.

Flexibility of the Building

The probability of future changes in library needs and program made it necessary to provide maximum flexibility. Accordingly, these library buildings have been planned as simply shaped shells enveloping spaces which can be rearranged when necessary. All stack and reading areas are laid out on a modular basis and the stacks and furniture are movable. The graduate or research stack areas can be rearranged or enlarged by adding to the building eastward. Stacks are supported on the concrete floors instead of being conventional, self-supporting tiers.

The west portion of the central catalog area, now used as a browsing room, can accommodate additional catalog cases when needed. Further expansion can be achieved by extending the catalog area all the way to the exterior wall at the west end. The director's offices would then be moved to the Law Library area.

The value of flexibility in the building's plan has already been realized. Major changes have been made in the organization of material in two of the library divisions.

Checking and Wardrobe Facilities

All checking out of library books is done at the building exits. This enables students to use all the material in the buildings without restriction. Next to each of the three principal entrances are outdoor book chutes where borrowers may return their books even when the buildings are closed. This added convenience is also a means of reducing unnecessary traffic within the building.

Another problem, whose best solution could not be determined until after the buildings were put to use, was the disposition of wardrobe facilities. It was important to discourage the students from using chairs or tables for their wraps, since this could mean providing two chairs for every reader. Wardrobe racks were provided in reading rooms and centralized check room facilities were placed near the entrances. Both facilities were provided, but in such a way that the spaces involved could be transformed to other uses if necessary. The decentralized wardrobe racks can be replaced by book stacks. The central check rooms can become study areas.

Lighting and Ventilation

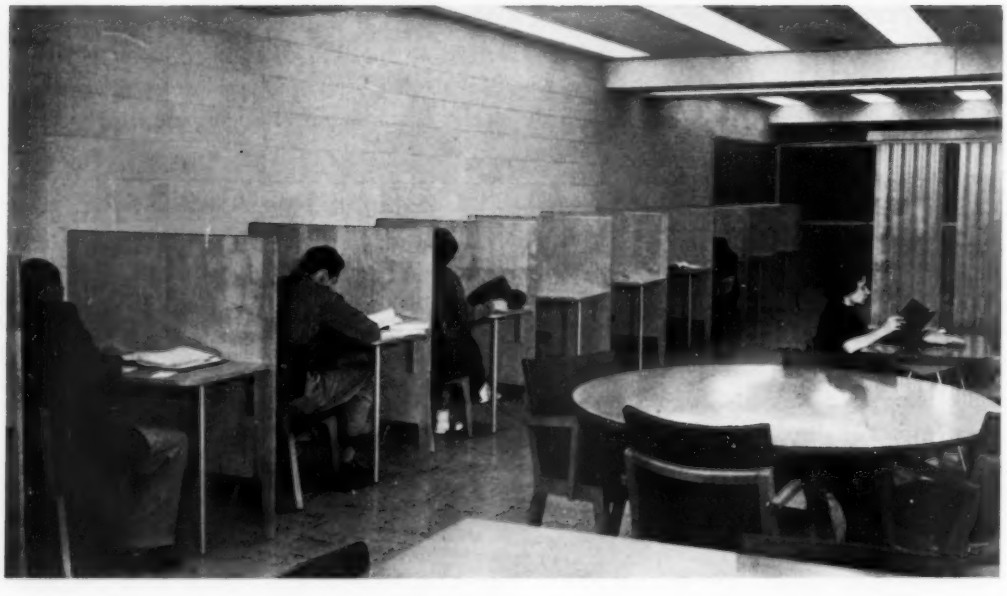
A high level of glare-free lighting is maintained throughout the reading areas–with intensities ranging between 30 and 50 foot-candles. In all offices and work rooms, indirect fluorescent fixtures with plastic diffusers are used. For the reading areas, the ceiling consists of 24-inch wide acoustic tile units supported on strips of metal pans. Every other strip between the metal pans is of wide plastic sheets with industrial type fluorescent



Entrance to the Law Library. The turnstiles and exit controls facilitate student traffic in the area. Luminous panels provide illumination.



This undergraduate reading area is located adjacent to the curricular collections.



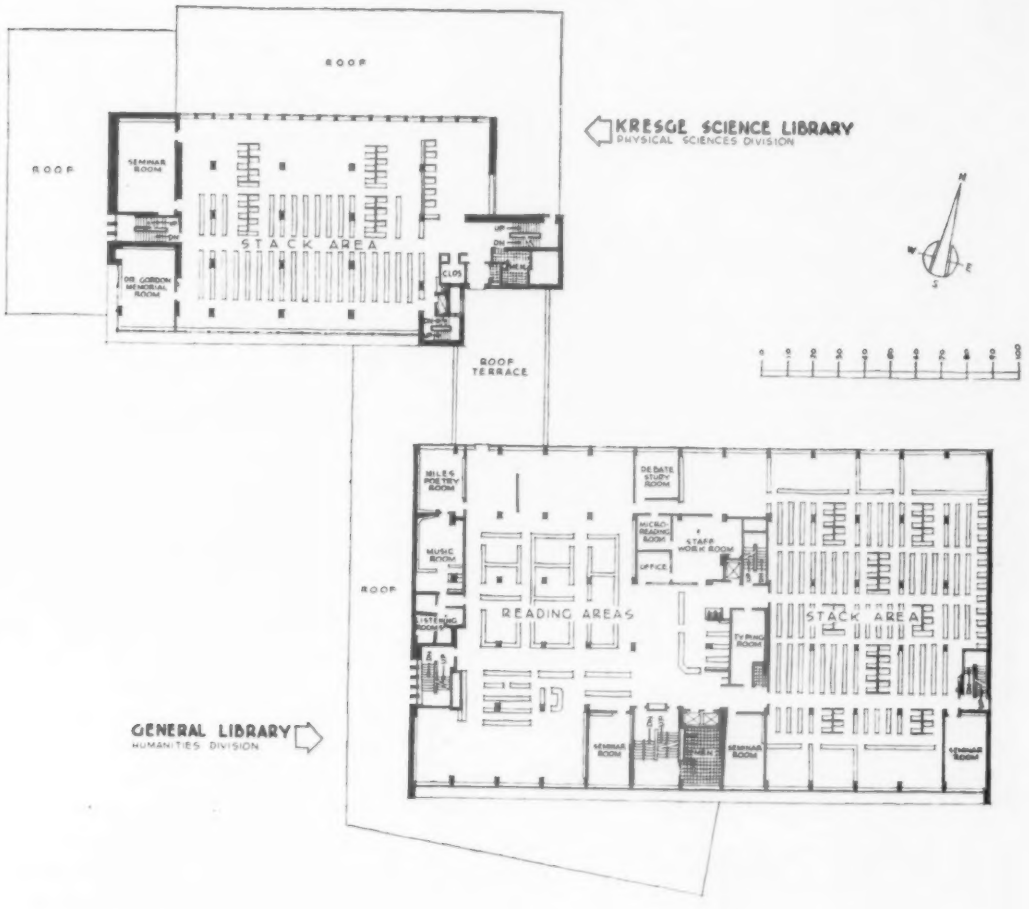
The education division of the library has a bank of movable study carrels. These inexpensive carrels are made of plywood with plastic tops on the writing surfaces.

fixtures hung above, independent of the ceiling. This proves to be an economical way of achieving low brightness with high lighting levels, combined with sound absorbing qualities. Warm white tubes have been used throughout for their pleasing color appearance.

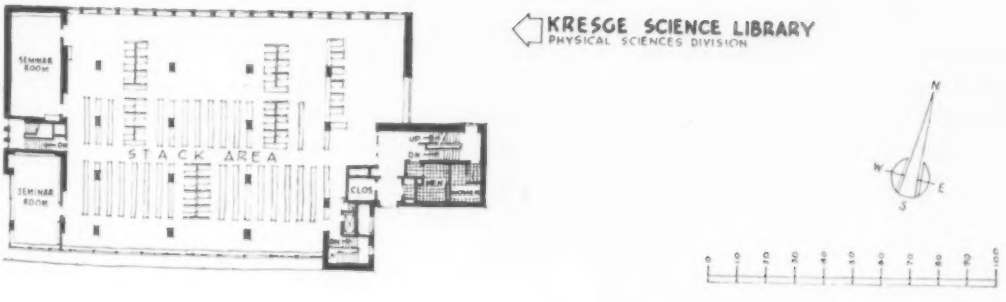
Completely Air-Conditioned

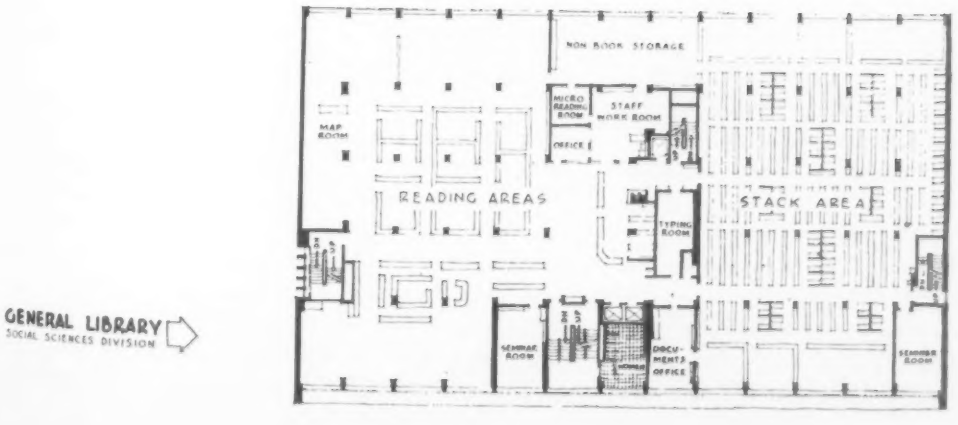
The general library is completely air-conditioned, with most of the windows sealed to prevent the infiltration of dust. A separate system is used for peripheral areas, consisting of units operating at high velocities at the windows. This system also serves to control excessive condensation, which would result from the high humidity maintained in the building for the preservation of its contents. The central areas are ventilated by a conventional air circulating system operating at normal velocities.

Comfortable chairs have been used in all the reading areas, with a generous number of lounge chairs. All upholstering is in colorful plastics. Tables are of modular dimensions so they can be put together to achieve different sizes. Circulation and service desks are of the unit type for easy rearrangement. In the larger reading areas, plastic screens are suspended from the ceilings to provide decorative separations which keep the rooms from seeming too large and institutional-like. Plastic traverse curtains are installed at

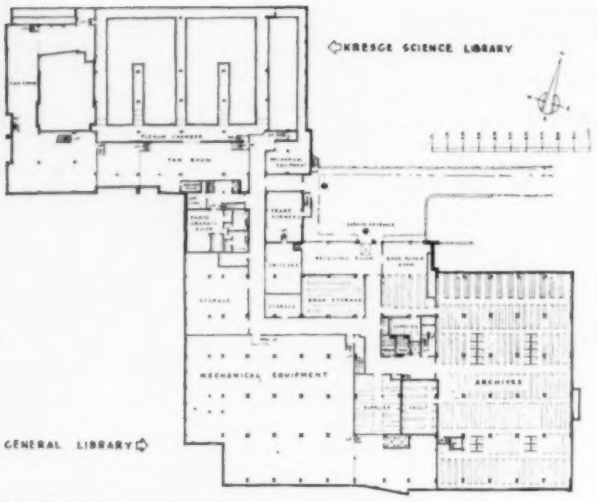


Second floor plan of the Wayne University Libraries. A roof terrace connects the wings.

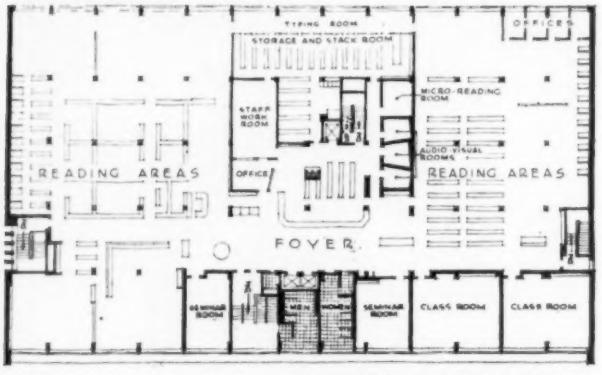




The third floors of the libraries are not connected. The general Library wing contains the social science division.



The basement area contains rooms for storage and for the mechanical equipment.



Fourth floor of the General Library houses the education division. There are two large reading areas.

the windows of all classrooms and seminar rooms for darkening when projection equipment is used.

Quiet, restful colors have been used, carefully coordinated so that the bookstacks and furniture appear to be integral parts of the building. Floors are of asphalt tile. Walls are cinder block, plastered only where required for sound barriers. Exterior walls are of gray brick with some portions of pink stone, aluminum and polished greenstone and granite.

The outlook of almost all the spaces is to the north or south, thus avoiding objectional sun glare from the east and west. Along the south, wide overhangs at each level shield the interior from the sun's rays fully in the summer time and appreciably at other seasons. These stone faced concrete overhangs also facilitate the cleaning of windows.

Development of the Plan

The design growth of these buildings has extended over many years. The director of libraries developed the philosophy of the libraries' organization long before any funds were available for the buildings, and before anyone knew when a new library could become a reality. After funds were appropriated for the building, he and the architects studied the deliberations of the Cooperative Committee on Library Buildings and visited university library buildings throughout the country.

The program given to the architects stated clearly the basic functional services the library was to provide, and the quantities of persons and materials to be involved in these services. Together, the librarian and the architects then translated these basic functional objectives into descriptions and sizes of spaces that would best serve them. From this point the studies proceeded to schematic diagrams of relationships, stack and furniture layouts, building plans, colors and on through the minutest construction details.

Both the director and the architects are certain that this close collaboration has produced efficient buildings for Wayne University's libraries.



Slyce

The campus at State Teachers College, Indiana, Pennsylvania. T-shaped building at center right is the new Leonard Hall.

NEW CLASSROOM BUILDING FOR INDIANA STATE TEACHERS COLLEGE



by ARTHUR F. NICHOLSON

Director, Public Relations Office, State Teachers College, Indiana, Pennsylvania

Mr. Nicholson has been associated with public education in Pennsylvania since 1938. He taught for ten years in high schools in Indiana and York Counties, and has been a faculty member at Indiana State Teachers College since 1948. At present he is also editor of two quarterly magazines in the education field. Mr. Nicholson received his B.S. degree from Indiana State Teachers College and his Master of Education degree from Pennsylvania State University.

LEONARD Hall, a new million dollar classroom building at the State Teachers College, Indiana, Pennsylvania, was occupied for use by academic classes beginning with the fall term in September, 1954. The building, which is being used for the instruction of classes in English, speech, social studies, mathematics, science, education, foreign languages and geography, replaces an old structure by the same name which was destroyed by fire on April 14, 1952.

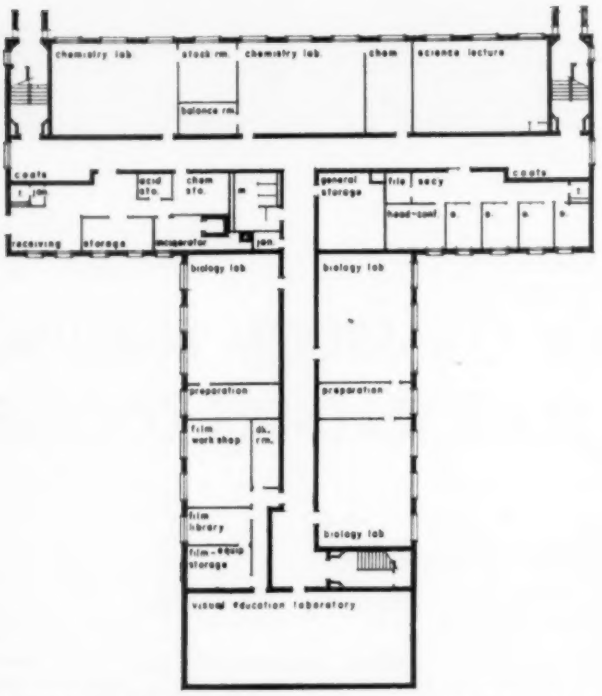
Immediately after this disaster the college administration and faculty, headed by President Willis E. Pratt, began to work with state authorities to seek replacement for materials lost in the fire. Such replacement was approved and the General State Authority allocated money for building the new Leonard Hall.

Planning the building was a cooperative project participated in by all interested faculty at the college in Indiana, the college administration, state educational authorities, officials from other state government departments, the architects and the General State Authority. Conferences among the faculty, together with Dr. Pratt and his administration, settled on the basic needs of the college in terms of a new classroom building and equipment. Faculty-administration committees took the various suggestions and points of view and put them into writing for the approval of state authorities.

Frequent consultations were held with the architects who were very helpful in taking faculty suggestions and transforming them into plans. Often the architects would make suggestions in turn which the

faculty and college authorities found to be much better than their own original concepts. The final plans made by Marlier and Johnstone, the architects, came after a room by room series of drawings of plans under discussion. In planning the building the new curricula for state teachers colleges in Pennsylvania and the other facilities available at the college were taken into consideration. In almost every instance the state authorities approved the suggestions of the college faculty.

Leonard Hall was designed by Marlier and Johnstone, architects of Pittsburgh. The building is T-shaped, three stories in height and of fireproof construction. The exterior is of red and black mixed brick to match



Plan of the first floor of the new classroom building features a visual education laboratory with a connecting workshop, library and film-equipment storage areas.

adjoining buildings, with trim of limestone. Because of the sloping site the first floor can be entered from the sides and rear only. The second floor is entered from the main north walk of the campus through the building's beautiful main entrance which is finished in emerald green Swedish granite. The outside steps approaching the native flagstone terrace at the main entrance are of Vermont granite. Four pylons, forming gateways to the terrace, are trimmed with limestone blocks on which are engraved symbols signifying the various subject fields in which instruction is given in the building.

Construction Features

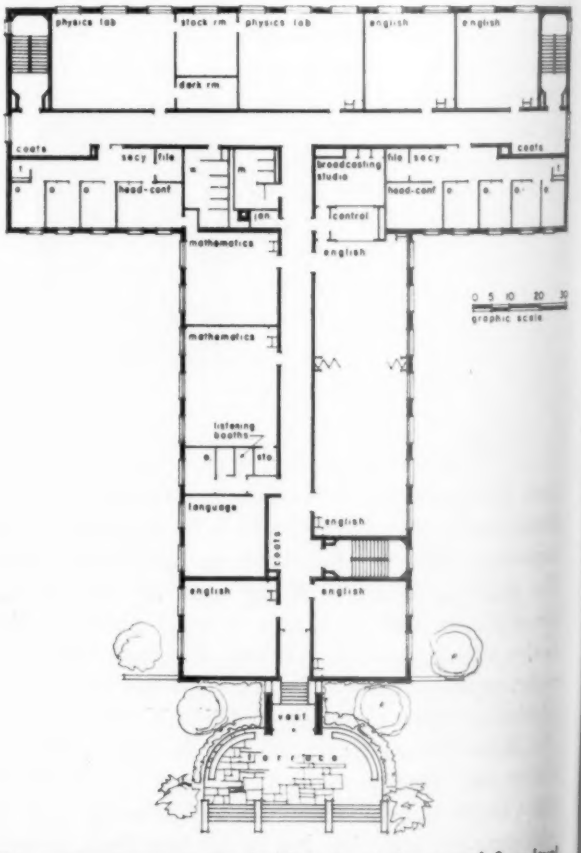
The construction of the building is of load-bearing masonry walls with steel joists over which a concrete slab was poured. These materials were used in order to circumvent a possible steel shortage at the time construction was begun and to speed erection time. Window sashes throughout the building are of galvanized steel. At the top of the building there is a penthouse in which are placed four ventilating fans, the air conditioning unit for the broadcasting room and studio and a motor control panel.

Walls and Ceilings

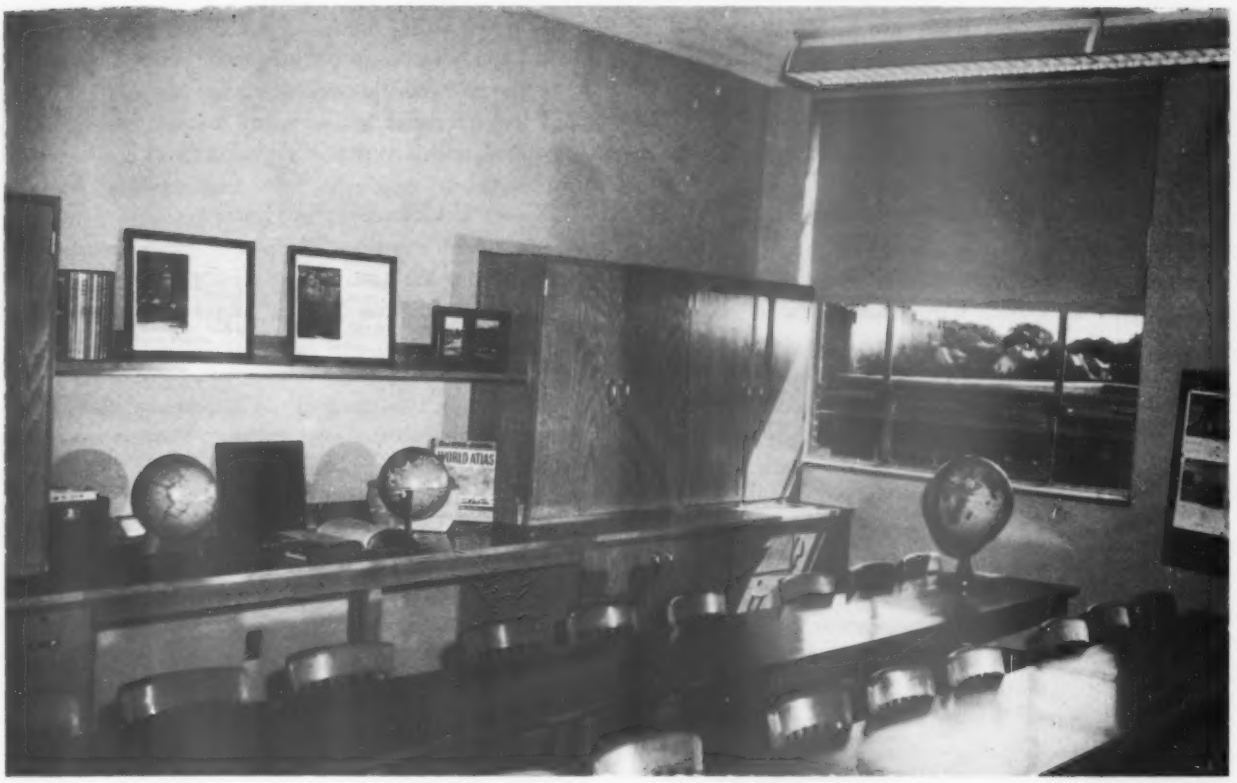
Throughout the building ceilings are of acoustical plaster, and floors are finished with asphalt and linoleum tile. All walls are of plaster over metal lath, except the corridors and stairwells which are finished with light buff face brick, and the science rooms and laboratories on the first floor which have glazed tile walls.

Chalkboards in all classrooms are of green glass framed in aluminum. All the furniture throughout the building is of natural oak. There are cloth shades in the classrooms and Venetian blinds in the offices. Interior doors are of oak in natural finish.

Rest rooms are located in the same area on each floor. Floors in the rest rooms are of ceramic tile and ceilings are of hard plaster. Men's rest rooms are finished in blue glazed tile and ladies' rest rooms in salmon

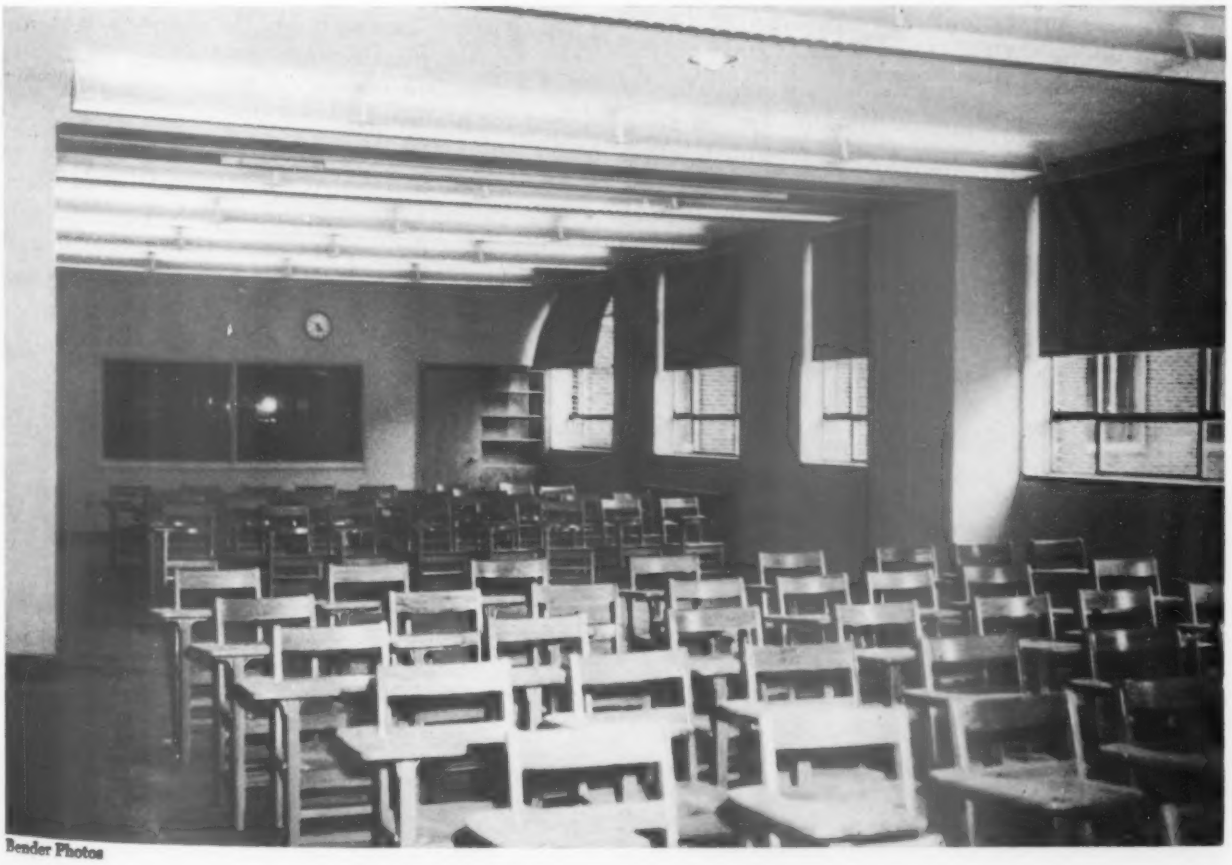


The main entrance to the building is at the second floor level. The large double classroom at the right can be divided into two smaller areas. The broadcasting studio is completely soundproof.



A section of the social studies laboratory which is on the third floor of Leonard Hall. The built-in cupboards are of natural oak.

This double classroom has folding doors in the center which can convert the area into two smaller classrooms. At rear are the radio studio and control room, behind double glass windows.



Bender Photos

glazed tile. Classroom walls are variously painted in light colors of brown, cream, green, yellow and gray.

First Floor Areas

The first floor houses an audio-visual education laboratory with interconnecting rooms for film storage, a film library, a darkroom and a film workshop. This laboratory has been especially designed with built-in equipment to meet instructional needs. The entire film library, including both films and equipment, had been burned in the Leonard Hall fire. A special allocation of $50,000 was made to re-establish this library within a few weeks after the fire. Additional government agency funds have been made available since to increase the equipment and films in the Indiana film library, all of which are housed in the audio-visual education section. The laboratory has an area available for the seating of 125 people. Also on the first floor are general receiving rooms and rooms for acid, chemical and general storage and an incinerator.

There are two chemistry laboratories with interconnecting preparation rooms, and a third somewhat smaller laboratory for advanced chemistry students. Tables in the chemistry rooms have individual fume hoods and steam cones. There are also a general science lecture room, three biology laboratories with two preparation rooms, five faculty offices with a waiting room area, working space for desks for secretarial workers and a storage area for science class supplies.

Second and Third Floors

On the second floor are two physics laboratories with a darkroom and an interconnecting preparation or stockroom and six English classrooms. Two of these classrooms are separated by a folding partition which permits them to be converted into one large room. This room is adjacent to a broadcasting studio and control room and may be used for broadcasting by large groups such as an orchestra or a chorus. The broadcasting studio and control room have been completely soundproofed with acoustical walls and ceiling, cork floors, double glass windows and an air conditioning system. The broadcasting studio also has ample built-in cupboard space to house records, sound effects, etc.

On this floor there are also one language classroom and an adjacent office with two listening booths equipped with acoustical tile on ceilings and floors and double glass windows, two mathematics classrooms and nine faculty offices in two suites with each group opening from a waiting room with space for secretarial help and for storage.

The third floor houses four social studies classrooms, one of which is specially designed for a social studies laboratory, one classroom for education and social studies, two geography classrooms with two interconnecting faculty offices and map storage rooms, four education classrooms, two of which are divided by a folding partition so that they may be used as one large room, two seminar rooms for round-the-table small group discussions, and nine faculty offices in two suites, each opening onto a waiting room and general office.

In the classrooms, in addition to the equipment appropriate to the subject matter course to be given in that room, there are small storage units of built-in cupboards in natural oak finish. All laboratory equipment is of the most modern type in natural wood finish. All science laboratories have special ventilating ducts and fans.

Heating in the building is by steam from the central boiler plant at the college using recessed convectors, syncretizers and unit ventilators. The syncretizers in each classroom bring air in from the outside and heat the air before fanning it into the classroom. A thermostat in each room controls the heating. The building has a complete exhaust ventilating system controlled from the penthouse.

All drinking fountains, two on each floor, are served with refrigerated water cooled by an electric water chiller. Lighting in the classrooms is furnished by semi-indirect fluorescent fixtures. Corridor and stairwell lighting is by incandescent lamps. The stairwells have large 10-foot windows which furnish ample natural lighting. Aluminum coat alcoves with book and hat racks are on every floor at the stairwells.

SERVING THE COLLEGE COMMUNITY AT SAN FRANCISCO STATE COLLEGE

by ERNA LEHAN

Director of College Food Services, San Francisco State College, San Francisco, California

Mrs. Lehan is a graduate of the Colorado College of Education. Following a teaching assignment in the Denver Public Schools, Mrs. Lehan was appointed to the food service staff at Stanford University. She remained at Stanford until 1947 when she was appointed to her present position at San Francisco State College.

THERE are days which mark events of importance in the lives of people and of institutions. For 55 years the faculty and students of San Francisco State College have dreamed of a permanent campus with adequate and efficient buildings. This fall the college officially dedicated its $13,000,000, 92-acre campus along the shores of Lake Merced in western San Francisco. The setting is a flourishing one now—nine modern buildings, a faculty of 366 and a total student enrollment of 7,350. It has taken half a century, but San Francisco State College has finally reached its fruitful harvest.

Symbolic of the growth and development of the college building program is the highly functional College Union Dining Hall which opened in September, 1953. The sixth of the nine planned buildings to be completed, the structure is located in the physical center of the broad campus. Truly, it has become the "heart" of the campus. Its location at the crossroads of student traffic was no accident. It was placed there to serve as a symbol of the college's traditional friendliness and as a focal point of community life at the college.

Recently a high city official in San Francisco described the college as entering a new era in its history. Certainly, this statement applies to the food service department. The history of this department is characterized by make-shift locations, success and failure; but its role was firmly established in the college community and the directors of the department constantly managed to improve its service and facilities. The era of struggle has ended. The new building is a monument to the accomplishments of the college administration, the hard work of the food service staff and to the people of California who supplied the funds for its construction.

Main entrance to the College Union Building at San Francisco State College.



The College Union is the product of five years of planning, dreaming and, finally, construction. Costing close to a million dollars, the Union is the first unit of a much larger structure which, it is hoped, can be constructed to provide complete facilities for student activities. Tentative plans have been drawn for a two story building to be added to the present structure. The addition will house offices for student government, alumni and publications; as well as lounges, reading rooms and recreation facilities. The completed building will truly be a "College Union"—one that services the needs of all members of the college community.

The success of the new food service building is the result of careful coordination among representatives of the college, the Division of Architecture, State of California, and a private firm of architects. The general planning team was composed of Dr. John Butler, Executive Dean; Mrs. Erna Lehan, Director of Food Services; Mr. James Grant, Mr. M. L. Sacks and Mr. V. Oglou from the Office of the State Architect. Mr. William Merchant was the chief architect and the S. J. Amoroso Company was the major contractor.

Plan requirements called for a main dining hall,



The kitchen cooking line. This is the main hot food supply station of all areas. The cook's serving table is heated with steam.

faculty and group dining rooms, central kitchen, storage and service rooms and a grill room for light lunch and fountain service.

The architect's treatment of the exterior of the building sets it apart from the other buildings. The building is open to view from all sides and yet service areas are equal to the design demands of the main section. By judicious window spacing and the use of concrete joint lines, all exterior walls are given a uniform quality without any rear view appearance. Construction is of poured concrete with a generous use of steel.

The main dining hall is 55 feet wide and 120 feet long. The room is free of supporting posts and is dominated by a 20-foot high glass and marble entrance which faces the open landscaped quadrangle. The entire front of the room has floor to ceiling windows with metal frames. The ceiling slopes slightly to the inside wall. Clerestory windows provide extra light and ventilation. The room has an eastern exposure.

The offices and faculty and group dining rooms are located in the northwest wing. This area has the normal 10-foot ceiling height. The grill room extends from the southwest side of the building.

The kitchen and serving areas are located in the center and rear of the dining areas. These areas have daylight and ventilation from skylights. All parts of the building have natural lighting.

The exterior of the structure is painted in three different colors for greater structural interest and balance. The main dining hall is finished in a warm grey. The north wing and the rear of the building are painted a dark brown. The grill exterior is done in brick red. White window trim completes the blend of colors.

Kitchen Is the Hub

The logical place to start the description of the interior is the kitchen, the "hub" of the building. All service and dining areas radiate from the kitchen. Naturally, this location saves steps and time, as well as improving service. It also facilitates supervision of the three serving areas and the two dishrooms. With one pivot, the production manager in the kitchen can check on the cooking and vegetable preparation, the butcher shop and, only a few more feet away, the bakeshop and main storeroom. All units are on one level for easy transfer of food. The kitchen is light and airy and employees can look out the high windows at sky and sun and have no feeling of being shut in even though the kitchen is in a central position.

Most of the 14-gauge stainless steel equipment was especially designed and fabricated to do a particu-

The bake shop has two 3-decked ovens, proof box and various racks.



lar job. The walls are tiled to a height of five and one-half feet in soft grey-green glazed tile. The plastered walls, the doors, the trim and the ceiling are painted in the same shade. The floor is surfaced with red quarry tile and slopes toward the floor drains in each area. The large stainless steel hood which covers the main cooking and steam line is furred in to eliminate difficult cleaning of the top surfaces of hood and pipes. The hood is equipped with removable grease filter pans which also make easy work of an otherwise hard and expensive cleaning chore. A recessed tile gutter collects all the moisture and drainings from the steam equipment and is covered with sectional metal grating to provide an even floor surface.

All sinks are of 14-gauge stainless steel with coved corners and all are free standing from the wall with no splash backs to foster contamination. Even the rolled edges of the sink are not closed, only ground smooth, so there is no place to harbor pests or dirt. The sinks have valve drains of a special California state design.



One side of the student serving area. The railing in the center is removable and can be taken away entirely or in sections.

They are not connected directly to floor drains, but spill into a deep porcelain floor drain which eliminates many plumbing problems. The tile floor is coved to form a baseboard and make a tight seal with the wall tile. It is also brought up to form a baseboard under the pantry cabinet and the cook's supply cupboard; but the steam table, ranges, ovens, etc., stand on feet to permit hosing and cleaning.

The butcher shop and vegetable room are closed from the kitchen by a glazed tile partial wall, not only to allow better light to these areas but also easier supervision. The butcher shop is next to the meat refrigerator and is equipped with a meat saw, tenderizer, meat grinder, portion scales, meat block, double sink and ample table space—all the conveniences needed for meat handling and preparation of meat dishes.

The cook's work table is located next to a large supply cupboard, divided into two parts and equipped with adjustable shelves which are covered with stainless steel. In one section are kept the various spices and condiments and a small supply of issued staple items for general cooking needs on a diversified menu. In the other half of the cupboard are stored various small tools and equipment. This results in an orderly kitchen and protects seldom used items from dust. Stainless steel roll bins for flour, sugar, rice, etc. are provided under the cook's table with a pan rack for small utensils above and a sink fabricated in one end. A larger shelf type storage rack for pans is located between the work table and the butcher shop for convenience to both.

Facilities for Food Preparation

The vegetable room is equipped with a potato peeler, a pedestal food chopper, two double sinks and a 6-foot by 3-foot laminated maple cutting table. A complete set of attachments is available for use on the cutter and there is a special cutter for French fried potatoes. The vegetable room is located directly inside the delivery entrance to the kitchen and across from the walk-in vegetable box. It also has its own outside window which provides extra daylight for inspection in the cleaning of vegetables. Crates are carried only a short distance to the trash room and finished vegetables are carried about five feet to the refrigerator or to the steam line for immediate cooking. The vegetable room is equipped for the preparation of all vegetables and fruit for pantry, cooks and bakeshop.

All cooking preparation is done in the back of the kitchen and only food ready for the oven or range cooking is brought to the front of the range line. In front of the ranges is a large water bath type steam table, or bain-marie, which has removable sections and can be as flexible as needed. A water type was chosen instead of dry heat because this is the main base of



The serving counter has a built-in tray slide and sloping front. The salad pans and beverage pans have drains for the use of ice.

supply for finished soups, meats, vegetables and sauces for all areas; therefore, it is necessary to hold food longer in this table than in the individual electric tables. The water bath is believed to be kinder to food than the dry heat of electric tables. All food is dished into portion pans at the steam table and delivered by a supply boy to various areas as needed. The pans are supplied through ports in faculty and student lines and empty pans are returned there. There is no intermediate holding station as the distance to the serving area is only a few feet.

The pantry has its own section at one side of the kitchen. A 60-cubic-foot supply refrigerator is provided for this area as well as a refrigerated trough in the center of the pantry set-up table to keep greens and salad mixtures cold. A variety of salads are served each day, making it necessary to store many items nearby. This department also has a pantry cabinet to hold small supplies and serving dishes. Nearby is a large recessed cupboard which has adjustable stainless steel covered shelves, one section storing issued canned goods, oil, vinegar and miscellaneous supplies for the pantry, and the other half designed for storing a daily supply of bread and sandwich rolls. The doors in this cupboard have metal louvers.

A second large stainless steel table is located in the pantry for the use of serving desserts, breakfast bread, puddings, etc. Finished salads and desserts are placed directly into the refrigerators behind each serving line and are taken out by counter women as needed to supply the salad pan on the counter side. Milk and juice are also placed in these reach-through refrigerators with glass doors, for quick supply at serving time. The double glass doors are not only handsome and easy to clean, but are a great help in checking quickly on available supplies from both the preparation and serving sides.

The bakeshop has its own room complete with outside windows for good light and pleasant working conditions. It has two 3-decked ovens, a proof box, a trunnion-type steam kettle, a small table mixer, a large vertical mixer, a sauce stove, a roll cutter, two work tables, each with laminated maple tops and with stainless steel roll bins for a variety of flours and sugars, special finished-goods racks, a large storage rack for clean equipment and a large double pot sink. The bakeshop is located next to the storeroom and a door is provided for wheeling bins through to be filled and for delivery of heavy supplies such as shortening and flour. A small area was taken from the main storeroom for bakeshop storage as there are many items needed and it is not desirable to have them cluttering the entire work area.

Rooms for Storage

At the rear of the building is an unloading dock of truck-bed height. The storekeeper's office commands a full view of this area. All goods are received and checked in by the storekeeper and then wheeled to areas where they are to be processed or stored. All meat and many other items are weighed in on a receiving scale. Goods are requisitioned and charged to the various departments who use them and complete stock records are kept. An inventory is taken on the last day of each month to check against issues. A bell is placed next to the storeroom door to enable persons to ring for the storekeeper if he is not in his office. The storeroom door is kept locked at all times to ensure stock control.

The storeroom has a well constructed cement floor and floor drains for easy cleaning. All shelving is built up off the floor about 5 inches and skids are provided for sacks and unpacked case goods. Walls and shelves are painted with grey-green enamel paint, the same as

The faculty counter serves the same menus as the student counter.



the main kitchen. Metal Venetian blinds with plastic tapes are provided on large windows to give a uniform exterior appearance and protect stock from strong sunlight at certain hours. A ventilating fan to pull out the hot air is installed in the windows. This storeroom is not too large; however, deliveries can be made as often as needed in a city area and the frequent turnover of inventory is desirable, except on items where there is a saving on quantity purchases.

The kitchen section of the building is excavated to provide storerooms for china and non-food supplies, rooms for mechanical equipment and a hot water boiler. All the refrigerator compresses are in the basement area on metal platforms. These are separate water cooled units to serve the two walk-in boxes, the deep freeze and the refrigeration in the serving lines. The central chilled water cooler is also located in the basement as is the ice making machine. The entire area under the serving sections has crawl space of five to five and one-half feet and a service tunnel which goes all the way around the outside area of the building. It is therefore possible to get to all conduits and plumbing pipes for service or change of equipment.

The building has numerous janitor closets with utility sinks and space for storing cleaning equipment. These rooms are convenient to all areas. There is an enclosed trash and garbage room off the main loading dock, just outside the kitchen, with a specially built large sink for the washing of cans and a steam hose for sterilizing them. Next to this is another room for storing returnable crates, containers and bottles for vendors to pick up.

Provisions for Employees

There is a small kitchen office with a window which commands a view of the main preparation area. This office is used primarily by the person who is in direct supervision of food production and personnel. The time cards file is in this office and employees must check in and out of work here. The men's and the women's locker rooms are close by, each having outside windows and complete facilities including individual steel lockers and a shower. An employees' dining room is also here. It is an attractively furnished room with sunlight entering through plastic louvers under a skylight.

There is a dishroom on each side of the main serving area which makes it possible to supply the counters directly with clean dishes. The clean dishes needed for setting up salads and desserts and for the grill room are returned through ports opening into the kitchen. Each dishroom has a T-shape counter designed for double operation in scraping and racking of dishes and is equipped with two garbage grinders, two single-unit glasswashers and two pre-rinse sinks with spring arm sprays. The racked dishes pass through a tandem machine which has a pre-wash tank and a tank containing the wash arms and rinse spray. This machine is equipped with steam and a steam booster for sterilizing the dishes in the rinse section. Also, each machine has an automatic soap dispenser. The dishrooms have sinks just inside the door leading from the serving area that are reserved only for washing coffee drip baskets from the serving line. Another sink placed on the other side of the room is for the use of dining room girls in servicing their cleaning equipment.

The Dining Rooms

The main dining room is designed to seat 500 and, figuring on these seatings between 11:00 A.M. and 2:00 P.M., can accommodate 1,500 students at lunch. This area is served by a double "open square" cafeteria counter. Either or both sides can be opened for service or closed off completely from the dining area with folding screen doors. This feature was devised so that the serving counter can be closed from view when table service is desired or when the dining room is being used for a program or receptions. In the center of the open square serving section are four large banquet storage cupboards. These hold quantities of glass and china for table service. The dining room is open from 7:30 A.M. to 3:30 P.M. on regular school days to serve full course breakfasts and hot lunches, coffee snacks and afternoon tea. The room is used on an average of once a week for special luncheons and dinners. Students are required to take their own dishes to the nearby dishrooms.



The main student dining room. The curtains are of mohair and jute and give the room a softening effect. Table tops are of formica.

The dining room walls are painted a dark brown with contrasting terra cotta pillars and soft natural color mohair and jute curtains at the large front windows. These curtains are made to draw with 150 percent fullness and are almost transparent, but they are very

effective for light control and give a much needed softening effect. The floors are of integral color terra cotta cement. This treatment was substituted instead of the quarry tile first specified because of the greater cost of tile and the necessity to choose a less expensive material or cut square footage. Quarry tile can be laid over the floor in time if it is necessary.

Wrought iron furniture was selected for this room because it will take hard wear and, being a garden type room, wrought iron furniture is appropriate. The chair seats are padded in elastic hair and cotton and covered with plastic "Java" cloth which can be easily washed. Half of the seats are upholstered in natural color and half in tobacco color. The table tops are formica in both walnut grain and prima vera grain and these are either 60 inches round or 36 inches by 72 inches oblong. The dark colored chair seats are used with the light table tops and the natural colored seats with the walnut tops. The two contrasting colors and shapes were used to form a pattern in the dining room to relieve the effect of repetition in so large an area.

The fountain grill room is a very handsome wood panelled tavern-type room with light amber shades, cathedral glass windows, a corner fireplace of red Roman brick, and walls overlaid in a diagonal pattern of wide redwood strips. Warm coloring and effective indirect lighting make this room a very inviting rendezvous for students. The grill has a double self-service bar. During its open hours, breakfast, mid-morning snacks, choice of sandwiches, hot foods, variety of short orders and fountain fare are available. The grill is furnished with both booths and round pedestal type tables.

The faculty dining room has its own serving counter. The same menu is served in the faculty and student lines at noon. This room accommodates 88 persons at one time. There are, in addition to the main faculty room, two group dining rooms with a modern-fold door between them. Each room seats approximately 35 people, and can be used for especially arranged breakfasts, luncheons, teas or small meetings. The walls in the faculty room are grey and in the group dining rooms, dark brown. Both rooms have imported Scotch linen drapes woven in a plaid combination of terra cotta, yellow, grey and white, which add very effective color and design. Chairs and tables in the faculty room are the same as in the main dining room with a slightly different design in the chair backs. All tops are walnut grain formica. A barrel type wrought iron chair was chosen for the group dining rooms with a boxed cushion seat upholstered in two-tone grey and yellow material to harmonize with the linen drapes.

The grill room has a double self-service bar for snacks and fountain fare. There are round tables and booths available to the students.



Services of the Dining Hall

San Francisco State College is host to many conferences and professional meetings and the food service is equipped to provide catering service for the convenience of these groups as well as for special class and student organization functions. However, the dining hall is not open to the public in general and there is no wish to compete with community restaurants or hotels.

One of the most successful features of this building is its completely coordinated color scheme. The rooms are of different hues but there is a transition of color from one area to another and a pleasing harmony. In this type of modern construction the rooms could seem very cold and uninviting if color had not been handled properly. Many compliments have been received on this feature of the building, and a great amount of credit goes to Mr. A. Dudley Kelly, interior designer of San Francisco, who advised the food service department on the colors for the finish schedule and on the selection of furnishings.

NEW DORMITORY FOR MICHIGAN STATE NORMAL COLLEGE



by BENJAMIN KLAGER

Controller, Michigan State Normal College, Ypsilanti, Michigan

Mr. Klager has been the Controller at Michigan State Normal College since 1948. Prior to that date he was superintendent of schools in Bay City and Manistee, Michigan. Mr. Klager has A.B. and M.A. degrees from the University of Michigan and a Master of Education degree from Michigan State Normal College.

"AMERICA'S colleges and universities have just completed a trying and challenging period during which they have provided educational opportunities for twice as many students as they have ever accommodated before."

With these words the Michigan Council of College Presidents, in its report on higher education in Michigan, indicated the problems faced by colleges. The Council further stated:

"Ahead is a mountain even steeper and more rocky than the one at our backs. All colleges will be asked to double their capacity during the next seventeen years. These public institutions have no choice and would want no other than to educate the gradually increasing numbers of students as adequately as they can with the facilities they have."

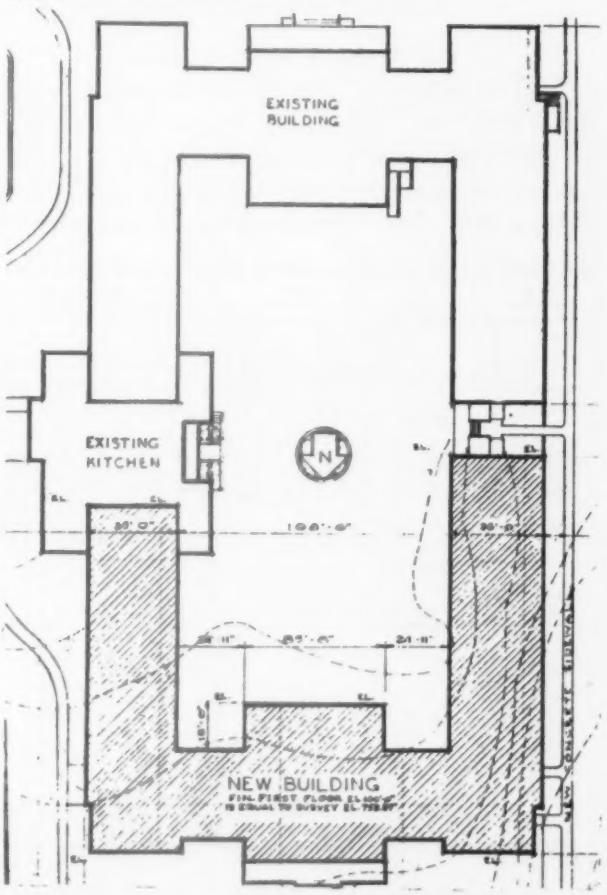
This situation can undoubtedly be duplicated in many other areas of the United States. How to cope with the anticipated increase in college enrollments is a serious problem when considered from the standpoint of classrooms, laboratories, libraries and similar facilities. How to provide living quarters for these students is an even greater question for many institutions.

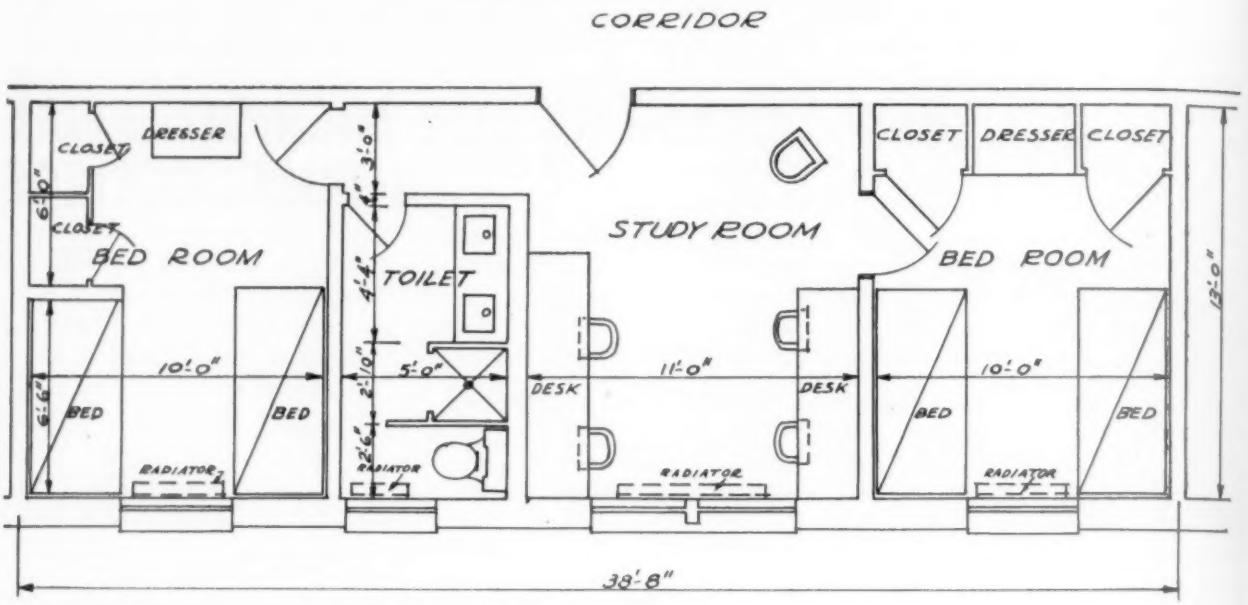
Most college administrators will agree that the use of existing physical plants for instructional facilities can be greatly expanded by lengthening the college day to include early morning, late afternoon, evening and Saturday morning classes. In fact, an analysis of this situation by individual institutions may indicate that present facilities can be extended to accommodate an increase of 75 percent with proper adjustments of personnel.

When we consider a program of living quarters for these students, however, we find an entirely different picture. Most dormitories and residence facilities are now being operated at normal or above capacities. In fact, many are now carrying emergency overloads. Unlike the classroom situation there is no opportunity to pick up slack by extending the period of daily use.

This problem must be solved either through the construction of additional housing facilities by the col-

Student housing will be improved at Michigan State Normal College with the new women's dormitory, planned to accommodate 230 students.





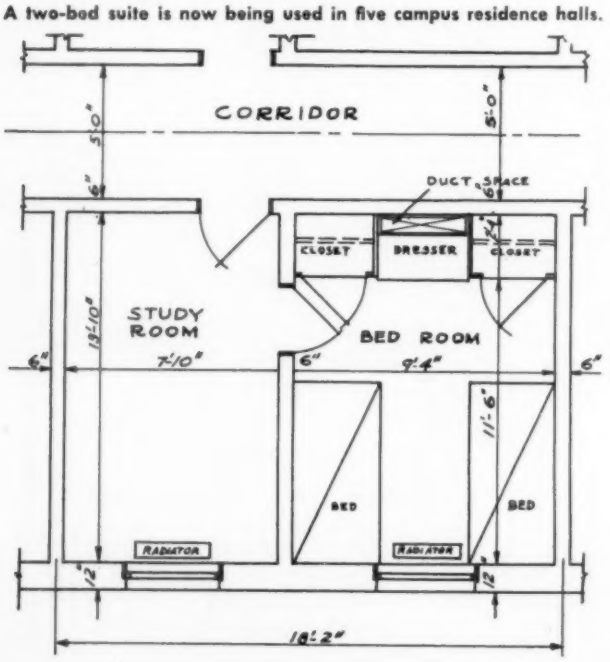
This proposed 4-person suite would permit 120 square feet of area per resident. The unit has a toilet, study room and two bedrooms.

lege or by relying upon the community to house an increasingly larger percentage of college students. While each institution will find a different situation regarding the ability of the community to absorb increasing demands for student housing, it can hardly be anticipated that community housing can or should be expected to remedy this situation in its entirety.

The Problem of Financing

In exploring the possibility of constructing residence halls and married students' apartments perhaps the most serious problem is that of financing. This problem becomes aggravated when the financial resources of the institution have been programmed and pledged largely for academic and instructional expansion. A generally negative attitude on the part of state legislators to provide construction funds for housing facilities for students in tax-supported institutions limits the method of financing these structures to self-liquidating or partially self-liquidating programs.

A two-bed suite is now being used in five campus residence halls.



Self-liquidation may have a different meaning in each situation. It may mean what the term implies; namely, that all construction, maintenance and operation costs must be paid for and met from operating income; or it may mean, at the other extreme, paying for the initial construction and equipment costs only. Constructing residence halls and providing the original equipment required, including such community facilities as dining rooms, kitchen, lounge and similar areas, have been variously estimated to cost between $2,500 and $5,000 per student, depending upon the type of construction and the appointments included.

Many factors determine where in the above range of costs a particular project will fall. This cost, in turn, is usually limited by the degree of self-liquidation required for a definite project. Serious questions can be raised concerning whether or not a project can be completely self-liquidating when total project costs exceed $2,700 per student, unless unusually high service rates are charged.

Where new construction can be partially subsidized by self-liquidating projects already in operation the problem is greatly simplified. In any event, the college must evaluate the entire situation before making decisions on important questions, always keeping in mind the necessity for producing the best possible housing accommodations within the financial limitations prescribed.

Some of the decisions which must be reached are:

1. The size and capacity of the residence hall for economical operation.
2. Shape, size and capacity of residence rooms.
3. Use of combination study and sleeping rooms vs. separate study and sleeping rooms.
4. Community type bath and toilet facilities vs. bath and toilet facilities for each suite of rooms.
5. Plaster vs. unplastered walls.
6. Built-in vs. movable type furniture and equipment.
7. Single vs. double deck beds.
8. Community living areas—extent, equipment, etc.

These and many other factors must be considered to bring the project within the realm of a self-liquidating program. Arguments relative to the merits and demerits of certain items will be numerous and inconclusive. Decisions will undoubtedly be made with the knowledge that they may be correct only because of the financial limitations that surround the project.

Residence Halls for Michigan State

In considering the program of residence halls for the future at Michigan State Normal College the above factors were not only carefully studied both from the housing and administrative viewpoint, but the advice and help of those most vitally concerned was sought—that of the students now living in college dormitories. Through the use of floor plan drawings, questionnaires and meetings with student groups we were able to get the thinking and reactions of a large number of students. We were also able to relay to them some of the problems and limitations surrounding the construction of residence halls.

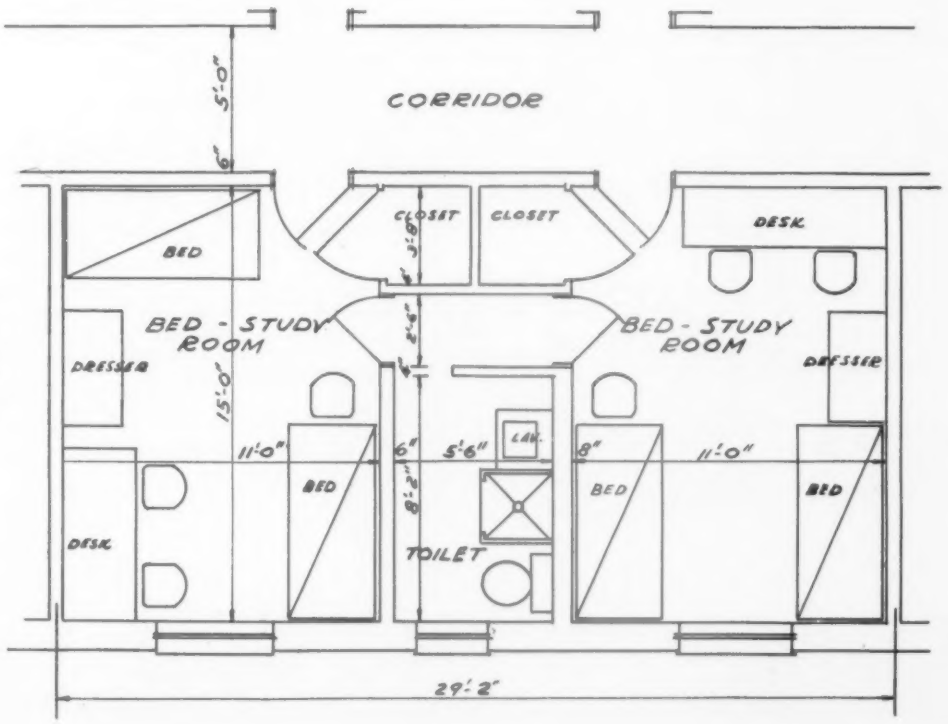
Following a crystallization of suggestions we erected temporary model suites in actual size, completely equipped with model furniture. In this way it was possible to conceive the actual living conditions for each room plan considered. Through a process of elimination and readjustment final decisions were made with greater assurance that the best possible arrangement had been selected.

The New Dormitory

As a result of this procedure it was concluded that our next residence hall for women will be constructed with a normal capacity of about 230 students. A four-person suite, consisting of two bedrooms, one study room and one bathroom, will be the basic unit and detailed construction plans are now being developed. Careful planning indicates that this building can be constructed and equipped for about $4,200 per student or an approximate cost of $966,000.

In determining the net required income for liquidating original construction and equipment costs we have based our requirement upon 7 percent of the amortized cost. The project will therefore require a $58,620 annual net income to liquidate the obligation over a period of 21 years. The terms of the financial loan agreement would probably also specify that this income be produced from revenue received under normal occupancy and that income received from excess occupancy be pledged for reserve or contingency items.

The experience record at Michigan State Normal College is a net return of about $175 per student per year when the building is operated at normal capacity,



Twelve units of this type will be incorporated into the new residence hall now being planned. The four-bed suite has combination bed-study rooms with a toilet between.

giving a total net return of $40,250. To make this unit completely self-liquidating would require a net return of $255 per student, which is excessive.

Other Assets to Be Pledged

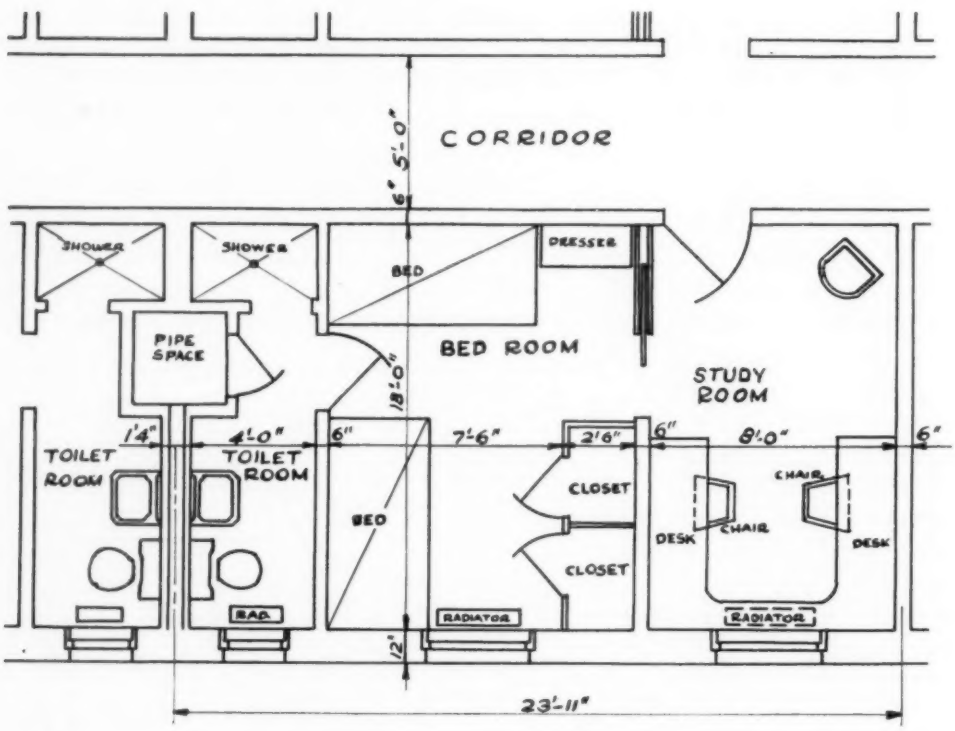
It is therefore planned to pledge assets from current self-liquidating projects to make up the difference between the net income from the new building and the required amount for amortization. Our experience has shown that a building of 225 capacity is probably the smallest building that should be undertaken from the standpoint of economical operation. Even so, the kitchen should be arranged to serve two or more units to cut costs.

Buildings of 200-300 capacity present no unusual problems of supervision or administration and the prorated costs for providing adequate community areas of living may be considered reasonable.

In deciding upon the building capacity for the proposed new residence hall unit at Michigan State Normal College the following conclusions were reached:

1. The size and type of the building (capacity 230) will fit in with existing residence halls and will complete an earlier projected new building program.
2. The four person suite with bath facilities appears to offer distinct advantages and meets our requirements more adequately than other plans considered.
3. It was determined that the following items compensated for increased costs for plumbing for individual suites:
   a. Release of area used for community bath and toilet facilities for other purposes.
   b. Use of non-plastered walls in residence suits and corridors.
   c. Certain economies in equipment installation.
4. The four person suite provides desirable and spacious living quarters for normal occupancy and lends itself to reasonable overloads when necessary.
5. The arrangement also presents distinct advantages for housing conference groups during low occupancy periods of the year.

Although some of these decisions may appear to be compromises, we are of the opinion that substantial improvements have been made over the existing plan for student housing at Michigan State Normal College.



A proposed plan for a two-person suite. This layout was finally rejected.

MUSIC BUILDING FOR SOUTHERN UNIVERSITY



by JAMES L. HUNT

Superintendent of Maintenance, Southern University, Baton Rouge, Louisiana

Mr. Hunt is a graduate of Lincoln University in Missouri. He also has an M.Ed. degree from Louisiana State University and has studied at Teachers College, Columbia University. Mr. Hunt had taught in the high school of Springfield, Missouri, prior to his position at Southern University.

THE Music Building at Southern University has 16,532 square feet of floor space and was constructed at a cost of $227,259. This includes built-in storage shelves for uniforms, robes and instruments, fixed seats in the choral rehearsal room, sorting racks in the music storage area and platform risers in all classrooms and rehearsal rooms.

The building was planned to house the entire university music instructional program, with its major emphasis on music education. However, the instrumental and vocal curriculums are planned as an integral part of the program of studies. The university choir, the university band, or units of these two organizations, have adequate rehearsal and practice space for individual members, ensembles and as a combined unit.

The building is on a reinforced concrete floor slab, over solid insulation. The finished floor is asphalt tile, except toilet floors of ceramic tile and platform risers of oak. Exterior wall construction is brick over steel studs. The interior walls are of acoustic plaster; wainscot cement plaster was dashed on and troweled. All plaster was applied over metal lath. The exterior walls, except in the band-choral rehearsal room and service rooms, are "window walls." Windows are of projected steel sash with bronze copper screening on aluminum frames. The roofing is 20-year built-up tar and gravel. Ceilings are acoustic on wood runners.

Mechanical Features

Heating for the building is by two-pipe forced hot water system, thermostatically controlled within four zones. As in all Southern University buildings, the boiler is of natural gas-fired cast iron. The band-choral rehearsal room has a thermostatically controlled unit ventilator, recessed in the floor at the rear of the platform risers. The toilet rooms, storage rooms and band-choral rehearsal room are equipped with forced air ventilation.

Classrooms, offices, studios and practice rooms are lighted with individually mounted, louvered fluorescent fixtures. The fixtures are designed for a maintained level of 35 foot-candles of light at desk height. However, the light distribution for the fixtures is 40 percent up-light and 60 percent down-light. As an aid to effective light reflection all ceilings are white and wall colors are only those which have a minimum reflectivity of 40 percent. The colors are varied light pastel shades. All

East view of the new Music Building at Southern University in Baton Rouge, Louisiana. The architects are Smith and Padget of Monroe.

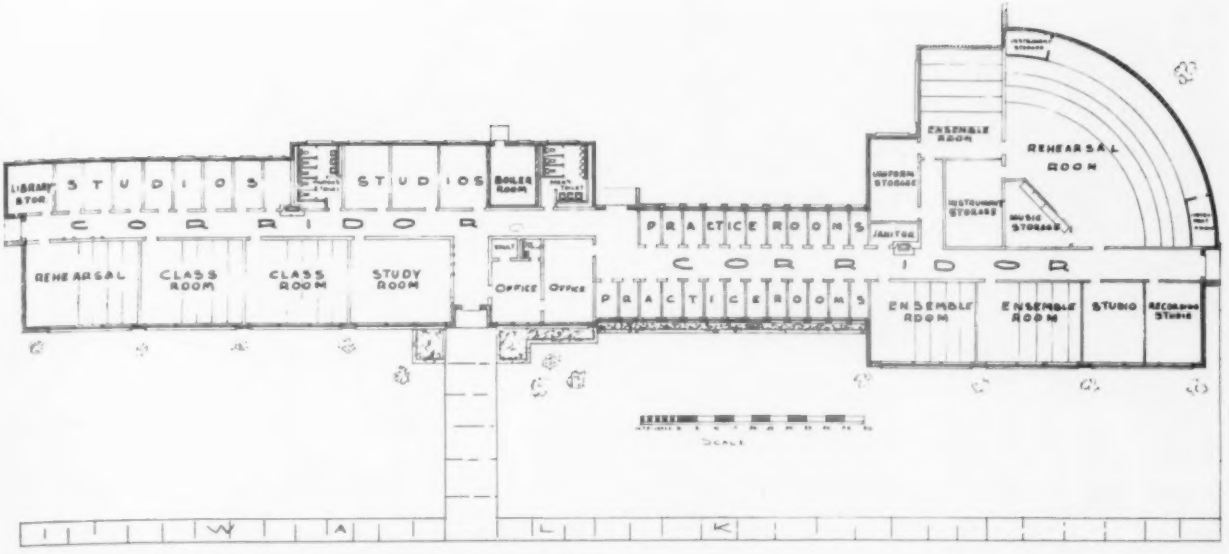




There are six classrooms in the Southern University Music Building. All rooms have platform risers, green chalkboards, and are equipped with 6-foot grand pianos. Music staff lines are painted on the chalkboards.

The band-choral rehearsal room is fan-shaped and located at one end of the building. Close by are storage rooms for music and instruments. The room has a thermostatically controlled unit ventilator, recessed in the floor at the rear of the platform risers.





Floor plan of the Music Building. Three of the six classrooms also serve as ensemble rooms. There are nine faculty studios, each equipped with a desk, file cabinet, bookcases and a grand piano. The recording studio is soundproofed.



View of the north side of the Southern University Music Building. Exterior wall construction is brick over steel studs.

woodwork and trim is natural finish figured gum. The classroom furniture is bleached birch.

Intercom System for Rooms

The faculty studios, band-choral rehearsal room and classrooms are connected by an intercommunication "press and talk" system. Calls can originate from the rooms or from the central control panel, located in the director's outer office.

The building has six classrooms, three of which serve as ensemble rooms and one as a choral rehearsal room. All rooms have platform risers, green chalkboards and tackboards, and are equipped with six-foot grand pianos. Studio and classroom chalkboards have music staff lines painted on the boards.

Studio Equipment

The nine faculty studios are equipped with a desk, file cabinet, bookcases and a grand piano. Three of the studios, assigned to instructors in piano, have two of these instruments in each studio in addition to the above equipment. All studios have green chalkboards with



Main entrance of the building. The windows are of projected steel sash with bronze copper screening on aluminum frames. The building is on a reinforced concrete floor slab over solid insulation.

painted music staff lines. The recording studio is soundproofed and equipment for broadcasting will be provided in the future.

Architects and Planners

The architects for the project were Smith and Padget of Monroe, Louisiana. The successful planning of the project can be attributed to the work and cooperation of the music faculty, the university building committee, the architects and the engineers. The orientation and space requirements for the classrooms, studios, rehearsal rooms, storage room and the appointment within these rooms were determined by the music faculty. The service areas, the coordination of plans with desirable mechanical features and the cost estimation were the work of the building committee.

The architects and consulting engineers scheduled frequent meetings with members of the music staff and the building committee to work out the many details required for each room, each area, mechanical features, color selection, floor covering and other such details.

The completed Music Building is a successful fusion of the many ideas and experiences of all the persons who planned and designed the building.

AUDIO-VISUAL TEACHING FACILITIES ON COLLEGE AND UNIVERSITY CAMPUSES



by MORTON S. MALTER

Associate Professor of Education, Oregon State System of Higher Education, Portland, Oregon

Dr. Malter, previous to his position in Oregon, was assistant professor of Education at Michigan State College. He was also a research fellow at the University of Chicago and a teacher in the public schools of Chicago. He received his bachelor's and master's degrees at Chicago Teachers College, and a Ph.D. from the University of Chicago. Dr. Malter has contributed numerous articles on audio-visual materials to various journals.

THERE are many audio-visual teaching facilities located on college and university campuses. The museums, teaching aids centers, radio stations, tape recording centers and television stations operated and maintained by colleges exercise a great influence on teaching-learning processes both on and off the campus.

Let us consider museums first. Museums have long been associated with institutions of higher learning. Many of them specialize in art, natural history, anthropology, physical science or some other branch of human knowledge or endeavor. Other college museums are more general in scope, cutting across the various disciplines or emphasizing heterogeneous collections of local significance.

In general, college museums serve two purposes. First of all, they are repositories of materials for study by graduate students or faculty members conducting advanced research. Since universities are dedicated to the advancement of knowledge, the repository-research function of the campus museum is a valid one.

A second purpose of the college museum is to provide materials for the advancement of general education. In this respect the museum is a true audio-visual auxiliary to teaching. The three-dimensional exhibit (often operative) is an audio-visual aid comparable to and probably surpassing the motion picture in general effectiveness.

Each year thousands of college, secondary and elementary students visit campus museums in connection with specific courses. Naturally, the usefulness of a particular visit will depend upon the degree of similarity between the contents of the museum and the objectives the visitors have in mind. College museum directors also encourage teachers to do considerable preplanning prior to bringing classes for visits. For a visit to achieve the utmost educational effect, the exhibits examined must be integrated with classroom activities.

According to a listing of the American Association of Museums, approximately 70 museums are located on college and university campuses. These campus museums include the Museum of Anthropology, University of California; Peabody Museum of Natural History, Yale University; Michigan State College Museum; Georgia Museum of Art, University of Georgia; University of Notre Dame Science Museum; and Oriental Institute, University of Chicago.

As a general rule the budgets, leadership, materials and buildings of museums are separate from other audio-visual aids centers on a campus.

Teaching Aids Center

The campus facility we associate most closely with "audio-visual education" is the teaching aids center. This center is responsible for such aids as motion pictures, slides, filmstrips, graphic materials, flat picture collections and tape recordings. The center also procures and distributes projectors or other types of equipment needed to use audio-visual materials.

The college teaching aids center is known by various names—audio-visual aids center, bureau of visual instruction, visual aids department, audio-visual center and visual aids bureau.

In 1953 a committee of the Department of Audio-Visual Instruction, N.E.A., reported that 689 colleges

Minnesota Mining & Mfg. Company



Tape duplication at the Minnesota "Tapes for Teaching" library is carried out on this unit composed of four magnecorders. Three copies can be made from one master in one operation.

and universities "have audio-visual service centers in various stages of development." In many of these institutions, however, the center includes a relatively small amount of audio-visual instructional materials and is administered on a part-time basis. *A Directory of 897 16mm Film Libraries,* issued by the U.S. Office of Education, lists more than 100 centers associated with institutions of higher learning. The latter figure is a far more reasonable estimate of the number of campuses that maintain reasonably well financed and administered audio-visual centers.

A study reported in *Film and Education* (Philosophical Library, New York, 1948) provides specific data revealing the extent to which college audio-visual centers differ in size. With 65 colleges and universities reporting, annual budgets ranged from $300 to over $200,000. Approximately one-half of the budgets were under $10,000, about one-fourth were over $20,000. The number of motion pictures reported by the 65 centers ranged from less than 100 to over 7,000, with the median being 500.

On the average, approximately 75 percent of an audio-visual center's budget is derived from general appropriations, with the remainder coming from rentals. About one-half of the total budget goes for salaries and operating costs, 40 percent for the purchase of materials and 10 percent for the purchase of projectors and other types of equipment.

In state institutions the teaching aids center frequently is a unit of the extension division. Other divisions to which centers in general are responsible include the general library, the school of education and a special administrative board.

Off-Campus Services

Many college audio-visual centers provide motion picture prints to off-campus schools and community groups. To a lesser degree, they also provide filmstrips, slides, recordings and other less expensive aids. Materials usually are made available on a rental basis.

Large centers, like Indiana University, distribute materials over a wide geographic area. Other centers restrict distribution to a particular state or locality or even to a special group, for instance, vocational agriculture teachers. Centers which have placed distribution on a business-like basis prepare and distribute catalogs which list films, rental costs and other pertinent information.

Some commercial film producers believe that the rental service provided by college film centers tends to discourage local film ownership. While there is some truth in this belief, it cannot be taken seriously as a general indictment. A study prepared at the request of seven textbook publishers (*Teaching Films Survey,* Harpers, New York, 1948) indicates that local schools in general are unable to support an adequate motion picture library. "For a long time to come," the study concludes, "most of the public schools in this country will get their films from lending libraries rather than by purchase from producers." This conclusion, of course, does not release college leaders from their professional obligation to promote local film ownership, whenever possible, or to encourage the collection of less expensive audio-visual aids.

In addition to providing materials, the college audio-visual center offers other services to off-campus schools. These include: (1) sponsorship of regional conferences; (2) lectures and demonstrations at faculty meetings; (3) consultation services; (4) workshops; (5) short courses; (6) selective lists of films in specific subjects; (7) research and assistance in film selection based upon cumulative film evaluation data.

On-Campus Services

The audio-visual center provides instructional materials, equipment, preview services and assistance in selection to on-campus instructors. In addition, directors of the centers cooperate with schools of education by offering formal courses in audio-visual education, assistance in special methods courses and materials for use by student teachers.

Obviously, the quality of on-campus service given

by the audio-visual center will vary from institution to institution. Considering the limitations imposed upon the centers, this quality on the whole is good. Certainly, few individuals on the campus are more enthusiastic and dedicated to their "mission" than the audio-visual director. But audio-visual directors are their own severest critics and, in the words of one, "their total achievement to date is trivial when measured against the opportunities."

Perhaps the severest criticism to be made of the typical center is that it has not, as yet, conceived of audio-visual materials in their broadest sense. Emphasis has been placed upon the distribution of commercial materials, while short shrift has been given to the production of especially prepared, specific-type teaching aids. The college professor who needs a set of graphs or slides for developing a particular concept does not find the center of much help.

The limited production of teaching materials is due in part to financial restrictions. The center simply does not have a sufficient budget to help each instructor with his particular problem. Yet, it is also recognized that many audio-visual directors have become so preoccupied with motion pictures and other commercial materials they have lost sight of the broad scope of their field. Until these directors regain a proper perspective, it will be difficult for the typical center to function as an effective instructional materials facility.

Radio

A list compiled by the National Association of Educational Broadcasters shows that 113 radio stations are operated in the interest of education. Of these stations, 77 are owned and operated by colleges and universities. It is estimated that educational radio in general is capable of reaching 50 million listeners.

There is little doubt that educational radio is beneficent to the general public able to receive its broadcasts. Although the "Hooper ratings" of its programs may be low in comparison to commercial competition, the sum total of its impact is large. Few listeners served by educational radio are likely to remain completely unaffected by the high quality of its programming. Good music, sound drama, sensible discussion and well balanced newscasts are its earmarks.

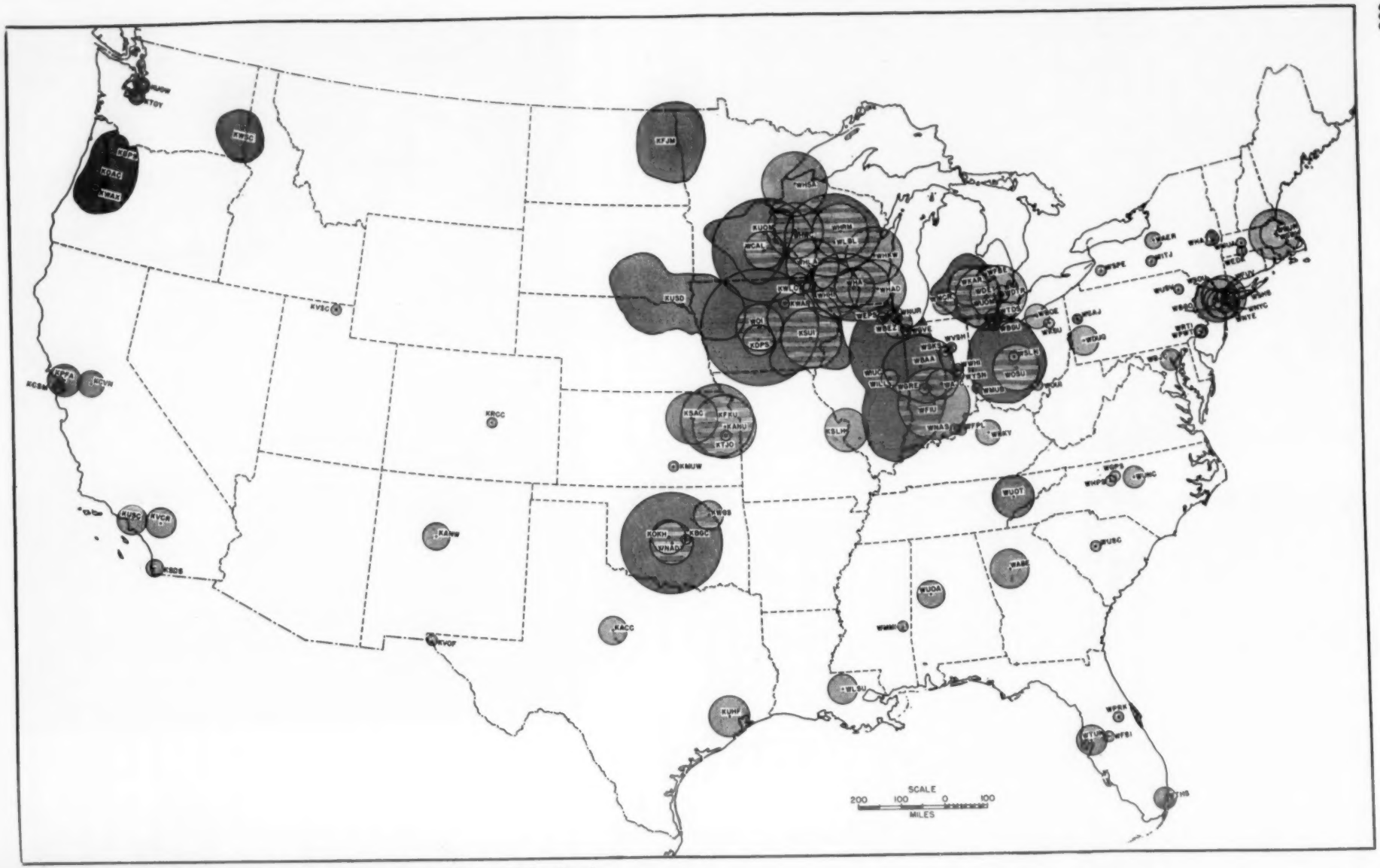
A number of campus radio stations also direct part of their efforts to in-school listening. Station WKAR, Michigan State College, for instance, has just completed its sixteenth year of "Adventures in Music." Designed to supplement the classroom music programs for grades 4, 5 and 6, the series is heard by an estimated 300,000 Michigan school children each week.

The 1953–54 annual report of the Oklahoma School of the Air, operated by Station WNAD, University of Oklahoma, provides some insight into the total in-school programming activities of one educational station. In brief, the OSA presented 323 fifteen-minute in-school broadcasts during the year. Since each program was rebroadcast, this amounted to 161½ clock-hours of in-school programming. Among the programs broadcast were "Making Friends with Music," "Know Your Oklahoma," "Your United Nations," "Spotlight on Health" and "Tours in Science."

Total school enrollment of the OSA during



There are about 70 museums located on college and university campuses. Thousands of students visit them each year.



A.M. and F.M. radio stations affiliated with the National Association of Educational Broadcasters. These stations have a potential audience of 50 million listeners. Most of the stations are located on college and university campuses.



A television program is underway at WKAR-TV at Michigan State College, East Lansing. Home gardening is being explained on the "Better Farming" program.

1953–54 was 133,093. Pupil clock-hours of in-school listening amounted to almost a million. Approximately 7,000 copies of teaching publications relating to the programs were provided to teachers in the field.

Although the achievements of the Oklahoma School of the Air and similar efforts are significant, the influence of educational radio upon the schools has not yet reached original expectations. Stated otherwise, the predictions of several decades ago that "radio would revolutionize teaching" have not been borne out. Thousands of classrooms today either are without radio receivers or fail to take advantage of prepared offerings.

Why has educational radio failed to meet our expectations as a classroom aid? Foremost among the reasons is the fact that the potential originally assigned to radio had been exaggerated. Radio, while a useful supplement to other verbal means of communication, was soon discovered to be an incomplete way of changing behavior.

Teachers have also experienced considerable difficulty in integrating radio with on-going classroom activities. They have found that programs either come at inappropriate times or do not coincide with topics of the day. Although these obstacles to the use of radio can be overcome through careful planning, the problem of integrating radio (at the time it originates) with on-going classroom activities remains a bothersome one.

Tape Recording Centers

The usefulness of radio as an educational tool can be enhanced considerably through the use of the tape recorder. Educational programs originating from college and commercial stations can be recorded, then played back in the classroom at an appropriate time. This, of course, is an excellent means of overcoming the problem of integration.

The idea of recording radio broadcasts for future classroom use is not new. The transcription exchange, operated by the U.S. Office of Education, has provided educational discs for many years. But it took the development of the tape recorder to make the distribution of prerecorded programs more feasible. Tapes provide a simple means of recording broadcasts and, moreover, are a relatively inexpensive material for the user. When the taped material is no longer desirable, the tape can be erased and is available for further use.

In 1949 the Minnesota Department of Education, in cooperation with the University of Minnesota, pioneered in the development of a tape recording center. Aided by a grant from the Minnesota Mining and Manufacturing Company, the center recorded selected educational programs on a master tape, then provided duplicates upon request. The only cost to the schools requesting duplicates, outside of the tape, was postage. In the first 32 months of operation, the center issued duplicates of 20,102 programs.

A tape recording center, or library, has now been established at the University of Connecticut, the University of Michigan, the University of South Dakota, the University of Washington and a dozen other institutions. As a general rule, responsibility for the tape recording library has been delegated to the teaching aids center.

Television

By June, 1954, four colleges were operating noncommercial television stations in the interests of education: KUHT-TV, University of Houston; KTHE-TV,

Broadcasters. These stations have a potential audience of 30 million listeners. Most of the stations are located on college and university campuses.



The audio-visual center has facilities at its command to produce teaching materials for specific class situations. Commercial materials do not always meet the needs of the instructor.

University of California at Los Angeles; WKAR-TV, Michigan State College; and WHA-TV, University of Wisconsin. Several other college television stations were scheduled to go on the air before the end of the year.

Since educational TV is an innovation, we cannot judge its effectiveness in terms of a great deal of direct experience. It does seem reasonable to believe, however, that its effectiveness, growth and problems are likely to be similar to those of educational radio. This means that educational TV will find it difficult to overcome the competition of commercial stations. It also means that the problem of integration must be faced in in-school programming. Finally, it means that educational TV should be encouraged for, like radio, it is potentially capable of contributing substantially to the total culture.

Educational TV, of course, faces a more serious financial problem than educational radio. TV requires a relatively large capital outlay and operating costs are high. Substantial outlays must also be made for backgrounds and props. If the visual element in educational TV is not fully exploited, it is likely to fall that much further behind its commercial competition. Stated otherwise, educational TV cannot survive if forced to depend upon panels, discussions or demonstrations that are primarily audio presentations.

The small number of colleges and universities which include TV stations among their audio-visual facilities are to be commended. It takes considerable courage and vision to undertake television broadcasts in view of the many practical and theoretical obstacles.

Additional Campus Facilities

Other audio-visual facilities, besides those mentioned here, are located on campuses. A number of institutions, for instance, have facilities for producing first-rate, technical motion pictures. Pennsylvania State College has been conducting research in the field of audio-visual materials. Campus radio stations frequently provide transcriptions, while some colleges have facilities for producing models, mock-ups or graphic materials.

In addition, various campus departments have developed and maintain audio-visual materials apart from the central facilities. This is especially true of departments of speech, geography, education, medicine and many of the other sciences. And, of course, numerous campus instructors have developed materials for use in specific courses.

Any consideration of campus audio-visual facilities would be incomplete without some reference to the "internship." As a first-hand, direct experience, the internship is an audio-visual "aid" in the fullest sense of the term. More and more, the professional departments on the campus are using the internship as a means of supplementing on-campus offerings.



Equilateral triangular tables can be arranged to accommodate large conference groups as well as being used individually.

SELECTION OF EQUIPMENT IN COLLEGES



by PAUL W. SEAGERS

Professor of Education and School Building Consultant, Indiana University, Bloomington

Dr. Seagers' professional experience includes 23 years in public school work—from classroom teacher to administrator to state department supervisor—and seven years in university work. He has been to Germany twice since the war to assist in planning new German school buildings, and lectured in Switzerland. Dr. Seagers will be director of the proposed International Institute of School Planning at Indiana University. He has an A.B. degree from Cornell University and M.A. and Ed.D. degrees from Teachers College, Columbia University.

SINCE World War II most colleges and universities in the United States have doubled their enrollment and the end is not in sight. In Indiana it is predicted that the college enrollment in 1970 will be double that of today. These facts indicate that millions of dollars will be spent on college furniture and equipment during the next fifteen years. Will these millions be spent on prewar types? Will the furniture be selected on the basis of price alone? Will some dictatorial purchasing agent or business manager have all the say? Is there a workable cooperative way of approaching this problem? The author does not hope to answer all these questions but rather desires to point out some reasonable practices which will ease many tensions developing from the selection of equipment and at the same time more nearly guarantee that the equipment will be functional.

Equipment should be evaluated in terms of its proposed use. There have been comparisons of design, finish, comfort and price but composite objective and subjective evaluations with pre-established standards or norms are seldom made. Each department in a college should study its own needs and arrive at functional standards by determining the use of the equipment, its size and its peculiarities as to material and finish. Does it need to be movable, easily stored or designed for multi-use? Must it fit special groupings or combinations? Does it need to be adjustable in any sense? These and many other questions will aid in developing the desirable standards. Then an evaluation of the equipment available on the market should be made. If none reasonably meets the requirements, then experimentation and the development of new designs are in order.

Who should initiate and coordinate all of these activities? Without a doubt the person should be a trained educator who would become the coordinator of educational space and equipment. More about him later. Even without this desired coordination most colleges and universities are fortunate in having some creative people who have developed new equipment, most of which is locally or custom built. The majority of institutions are not aware of these new designs and do not benefit from localized efforts. As long as proven standard equipment is in demand, furniture manufacturers hesitate to retool for a new design with a questionable market. However, if the new equipment were designed to meet reasonable, pre-established standards and sufficient publicity attended its development, many

man-hours would be saved by other institutions and manufacturers would not be so reluctant to begin production.

Rooms Are Much the Same

Types of rooms do not vary appreciably in colleges. There are classrooms, lecture rooms, conference rooms, seminar rooms, laboratories, offices and bookstores. Classroom furniture has not changed much. The tablet arm chair is standard because it is inexpensive, occupies a minimum of space and is movable. Yet it is difficult to clean under, is frequently uncomfortable and lacks note taking space and bookracks.

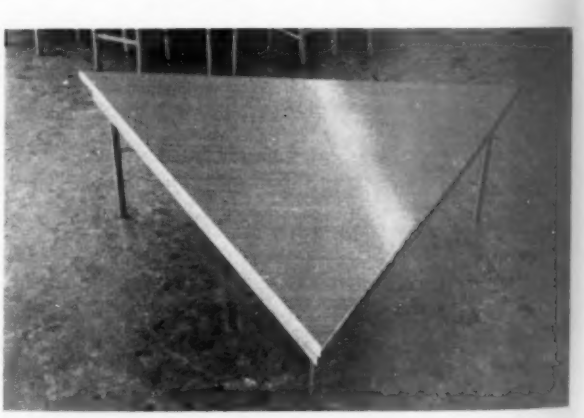
Lecture rooms with sloping floors may be equipped with comfortable auditorium type seating with folding tablet arms. In Europe many lecture rooms have desk tops attached to seat backs similar to the old type fixed desks so long popular in this country. Sometimes, where the floor is stepped down rather than ramped, these combination desk-seats are fastened to the risers for ease of sweeping as in some types of stadium seating. Often the desk tops fold down for ease of access.

Conference rooms are becoming more popular in colleges and universities. Teachers College, Columbia University, has done considerable experimenting with these rooms. One room has been equipped with isosceles triangular tables and light metal upholstered chairs. Another room has upholstered furniture which can be arranged in conference semi-circles. These rooms are comfortable and a person can still feel fresh after a day's conference in their relaxing environments.

Two rooms in the School of Education, Indiana University, are furnished with equilateral triangular tables, measuring seven feet on each side. These can be grouped in many ways and can serve conference and discussion groups of up to fifty people. Some professors have expressed a preference for trapezoidal tables similar to those now used in elementary schools. An excellent table for administrative conference and seminar rooms has been developed at Indiana University. It is a long truncated triangular table with the truncated end about half the length of the base. The leader of the seminar sits at the base and the attention of all participants is easily focused on him.

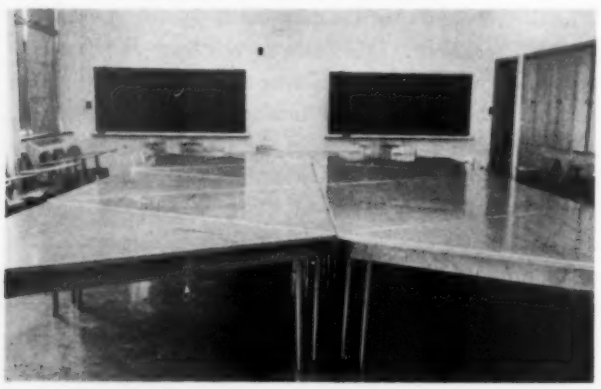
Laboratory furniture has changed very little in the last fifty years. Considerable research is necessary on the shape and size of the furniture. Light colored, nonglare table tops need developing. A more complete job analysis should be undertaken for research laboratories and general laboratories. Offices should be better planned. Again, Teachers College, Columbia University, has made some studies of professors' offices. They arrived at a small, neatly arranged room with plenty of bookshelving, comfortable upholstered furniture, files and a desk top fastened to the wall instead of a pedestal. Above the desk top is a bulletin board and display space. Beneath it is a shelf to accommodate a medium size drawing board to which current work can be attached and quickly put away when people drop in for conferences—a very functional office. At Indiana University 120 square feet of space is considered sufficient for a professor's office. Furniture consists of a desk or two desk-height files supporting a desk top (or flush door), two four-drawer files, two side chairs and one posture desk chair. The average office has 150 to 200 lineal feet of shelving. These offices are in suites of five or six, served by an outer office containing built-in files, two side chairs and two secretarial desks and chairs.

Although bookstores are not normally considered college rooms, practically every college has one or more.



The dimension of the equilateral triangular table is seven feet for each side. Two tables can be placed together to form rectangles.

A possible arrangement of the 3-sided tables.





Brigham Young University has made a study of equipment for bookstores and has developed some very interesting furniture. Colored peg board is widely used. Movable bookracks are attractive and yet utilitarian. The entire arrangement is one which induces a person to browse through the books.

We frequently accuse a university's purchasing department of making purchases selected on price. The truth in most cases is that we have not furnished the purchasing agent with good specifications, architectural and educational. This is because many of us do not know what we want. Most colleges and universities require bids. If specifications are not clear or three or more makes are not listed as meeting specifications, then the price of an item prevails as the basis of selection and almost any quality can be expected. If other than the low-priced bid is accepted, someone had better be prepared to defend that action, especially in a state-supported institution.

What Is the Solution?

What is the way out of this dilemma? It is rather simple, but time and effort consuming. First, there should be a "coordinator of space and equipment" in every institution. Regardless of his other functions and titles he should be an educator with an understanding of the utilization of space and the functions of furniture and equipment. Under his direction every department analyzes its own needs and carefully defines the purposes each type of equipment must serve. After these educational specifications are developed, the coordinator submits to each department samples, pictures and specifications of the equipment on the market.

If existing equipment does not meet specifications, funds should be made available to the department for experimentation and development of the particular type needed. Here the coordinating architect and structural specification writer should be consulted. When a satisfactory model or mockup has been made, definite structural specifications can be developed by the coordinating architect. Writing furniture specifications is a highly technical and difficult job and can only be done by a specialist. Photographs of the model or mockup should accompany all specifications. Every department should make such equipment studies as soon as possible or risk the dilemma of having money to purchase equipment and no organized plans for using it. Expediency purchasing is always dangerous.



A truncated triangular table is ideal for administrative conferences. It also serves well for seminar sessions.



A comfortable conference room will prove to be a valuable asset. The furniture in this room can be grouped in a semi-circle.

The quantity of equipment needed, estimated unit costs, educational and structural specifications, with supporting evidence of need, should be given to the budget director or university equipment committee for a priority number. If each department has its own equipment budget, priority is a matter of agreement within the department. Regardless of how priority is determined the purchasing agent should be furnished with complete specifications for each requisition. If existing equipment meets the specification, be sure to name at least three acceptable makes.



The conference or seminar leader can sit at the head of the truncated table and easily command the attention of all participants.

Checking the Equipment

When the bids are in and any of the three acceptable types are low, the purchasing agent will usually make the award. Then the coordinating architect need only check the equipment as delivered to see if it fulfills specifications and bids. If the equipment is new in design or is not one of the three or more designated as meeting specifications, the purchasing agent, the coordinator of educational space and equipment, the coordinating architect and representatives of the initiating department should meet to check bids and samples. If possible, agreement by a majority of this group should be reached before awards are made. If the low bid is not accepted, a written report should be prepared to justify the decision and back up the purchasing agent. Again, the equipment should be checked before payment is authorized.

This process may seem rather involved. However, it is simple once initiated and is one method of assuring each department of a university that it is getting what it wants. It also provides the purchasing department with more specific information and thus removes some of the guessing. The purchasing department should never be placed in the embarrassing position of having to make educational decisions because the educators are negligent. Of course, the one item still missing is a central place to which results of experiments can be reported and to which college and university administrators can turn for information. Indiana University proposes to provide this missing service soon.



Storage cabinets, built to fit specified requirements, can be included in the school modernization program. This cabinet has been designed for 24-inch by 36-inch paper.

SCHOOL BUILDING MODERNIZATION PROGRAMS



by GRAHAM R. MILLER

Assistant Superintendent for Business Services, Denver, Colorado, Public Schools

Mr. Miller was a principal of Denver schools before becoming assistant superintendent. He has an Engineer of Mines degree from the Colorado School of Mines and an M.S. from Colorado Agricultural and Mechanical College.



CARL H. SCHOENE

Director of Operation and Maintenance, Denver, Colorado, Public Schools

Mr. Schoene has been with the Denver public schools since 1927. He has taught custodial training classes at Colorado State College of Education, Hutchison Junior College in Kansas and Arizona State College.



CHARLES E. ARMSTRONG, JR.

Director of Planning Services, Denver, Colorado, Public Schools

Dr. Armstrong has been a teacher and supervising teacher in the Denver school system. He has a B.S. degree from Colorado College, an M.A. from the University of Denver and an Ed.D. from Teachers College, Columbia University.

DURING the next six or seven years, literally millions of our public school children may be without adequate school accommodations if boards of education, school staff members and citizens fail to cooperate in providing the needed facilities. Failure to provide these facilities will affect not only the parents whose children are of school age but also the welfare of every person in the community. Good education depends upon a proper physical environment as well as upon excellent teaching personnel, and even very able teachers are handicapped by substandard school plant facilities.

It is estimated that to catch up with current building needs and to accommodate the additional children who will need school housing by the end of the decade, at least 500,000 new classrooms will be needed. They will cost almost 20 billion dollars. The quality of the education which these children will receive depends to a significant extent upon physical facilities. It is important that those concerned give serious consideration to solving the problem of providing the necessary school buildings.

As new buildings are constructed it is reasonable to assume that, with proper planning, the new facilities will serve the needs of a specific community, and that the children who attend these schools will learn in a better-than-average educational environment. However, in the very same community other children may be forced to attend school in obsolete and otherwise un-

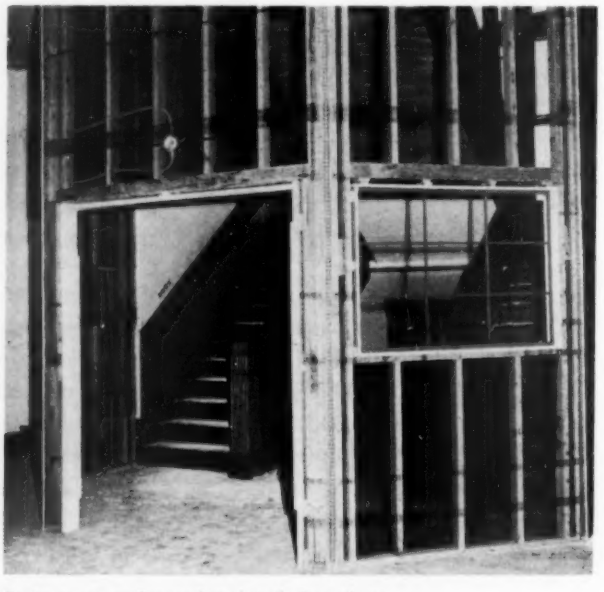
satisfactory buildings. It is the responsibility of citizens and school staff members to improve conditions so that all children will have the advantages of excellent teaching enhanced by an adequate physical environment. This can be accomplished with a well developed modernization program.

Evidence of the magnitude of programs of school rehabilitation and modernization on a nationwide scale is afforded by certain data in the School Facilities Survey of the U.S. Office of Education. This report shows that costs for rehabilitating and modernizing existing school plants, thus making them usable for another few years, will require more than 423 million dollars. Such a sum of money represents a substantial financial burden upon local taxpayers and must be spent wisely in order that the greatest number of improvements can be made for the money expended.

As the modernization program is contemplated, it is well to establish, by the cooperative efforts of all concerned, a set of criteria upon which the final outcome of the program may be judged. Because the judgment of each individual will vary according to his particular point of view, compromises may be necessary. However, each compromise should be weighed in terms of what the program is expected to accomplish.

Two Basic Principles

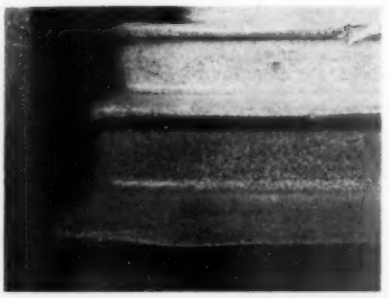
There are two basic principles which serve as guides for those who are planning a program of school plant rehabilitation and modernization. These will aid



Stairways can be enclosed to help reduce fire hazards in an older school building.

in establishing a common background of thinking for architects, community groups and school staff members.

Of primary importance is the health and safety of the children who occupy our school buildings. Building codes control to some extent the factors having to do with structural safety. Much can be done in old buildings to maintain them in safe condition or to make structural changes which will improve their present condition.



Worn stairs are a safety hazard in old buildings.



New stair treads will help to prevent accidents.

Secondly, there is the matter of instructional adequacy. School facilities, either new or remodeled, can be made to serve the educational program well if sufficient attention is given to this principle.

Health and Safety

For several years now the maintenance department of the Denver Public Schools has carried on its own inspection program in addition to cooperating with the city building department in recommending structural changes to reduce safety hazards in our school buildings. Typical of the work which is being done is enclosing the open stairways common in many of our older buildings.

Other building deficiencies which are being corrected include such work as: the installation of fire dampers in ventilating ducts, installation of fire doors and adequate exits from boiler rooms, separation of ventilating fans from the heating plant, provision for adequate combustion air for boilers and modernization of electrical service systems. Of equal importance is such work as the replacement of worn stair treads with approved metal safety treads properly recessed and anchored.

In this same category of health and safety is the problem of school lighting whose effect on children is significant yet less obvious in the immediate situation. Many old buildings are sadly lacking in both natural and artificial illumination. The importance of adequate, well controlled light is emphasized by certain data

which deal with the incidence of various eye weaknesses. For example, the amount of near-sightedness seems to increase as children progress through school. One study indicates that the defect increases from an incidence of about 7 percent in elementary school to about 24 percent by the end of high school study.

Refractive eye defects, as shown in another study, seem to increase as children progress through elementary school, increasing from about 18 percent in the first grade to 82 percent as children leave the sixth grade. It is estimated that about one out of every five persons now wears glasses, while another 20 percent actually need them. Although these data are not meant to fix the responsibility for visual defects solely upon seeing conditions in our schools, at least the implications are such that educators cannot overlook their importance.

Once aware of the importance of providing a proper visual environment in school buildings, much can be done to increase the levels of artificial illumination, to reduce visual contrasts and to improve, in general, the appearance and function of the entire building. Although relighting, refinishing and repainting are rather costly jobs, the expenditure [illegible] rms of increased comfort, reduced fatigue and the subsequent increase in teaching and learning efficiency.

Denver's Lighting Program

Denver embarked upon such a program with the result that all of the classrooms, more than 1,700 in some 80 existing school buildings, were relighted and refinished. Before the program was launched many thorough studies were made by school staff members, fixture suppliers and others, in order to establish reasonable standards of light intensities, reflection factors, glare control, paint colors and methods of procedure.

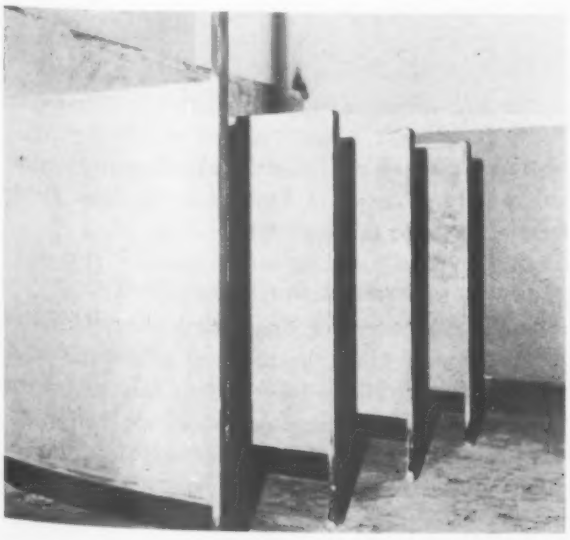
The following light intensities were agreed upon as reasonable minimums:

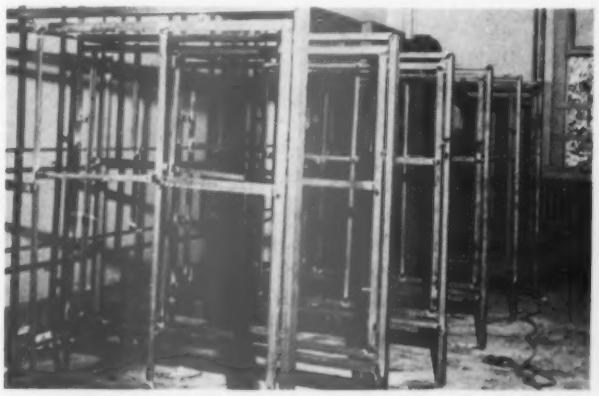
1. For ordinary reading and writing activities such as are carried on in regular classrooms. 30 foot-candles
2. Tasks like drafting, sewing, typing and printing, which are carried on in special rooms. 50 foot-candles
3. Large muscle activities such as active games and swimming in physical education classes. 20 foot-candles
4. Group meetings where no prolonged reading is involved. 10 foot-candles
5. Corridors, stairs and lobbies. 5–10 foot-candles

As important as providing sufficient light is the proper control of its brightness balance. Therefore, standards of light reflectance values were established and, within these ranges, wood finishes and wall and ceiling colors were selected by teacher committees in cooperation with the maintenance department. The established reflectance values are tabulated below for easy reference.

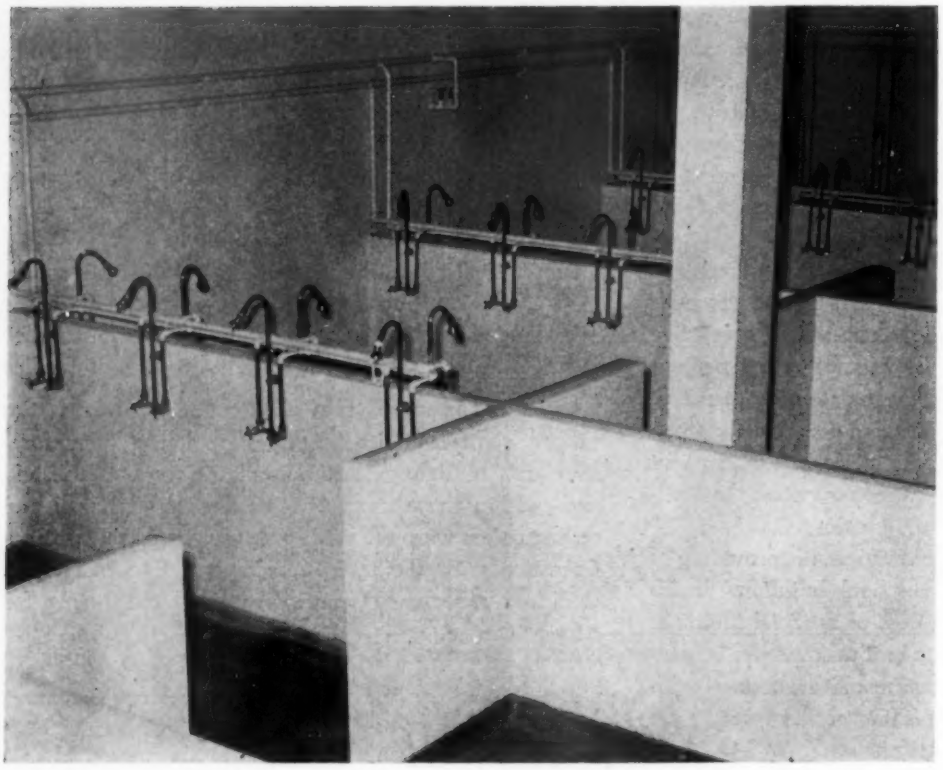
Area	Range of Reflectance Factors in Percent
Ceilings	80–85
Upper walls	80–85
Lower walls	50–70
Tackboards	50–60
Chalkboards	15–20
Wood trim	30–40
Window mullions	75–80
Furniture tops	35–50
Floors	15–30

Other items related to this factor of health are the remodeling of toilet rooms by replacing obsolete plumbing fixtures, and replacing toilet partitions with substantial steel and concrete ones. Further work has included the alteration of shower rooms, the closing of gymnasium windows to eliminate glare hazards, and





Maintenance problems in old toilet rooms can be lessened by installing steel frame work for the partitions. A concrete plaster finish, as shown at left, is easy to keep clean.



Obsolete shower rooms, like the one below, are difficult to maintain as sanitary areas. This type of room can be modernized, as was done with the room shown at left.

the installation of acoustical materials, not only in some classrooms and corridors but in areas like the auditorium and gymnasium.

The examples noted in the foregoing do not exhaust the possibilities for improving the school environment from the point of view of health and safety, but they do serve to illustrate what can be included in a modernization program.



Instructional Adequacy

Although health and safety provisions are of prime importance, they cannot be considered without attention to instructional adequacy. Functionally adequate buildings can very well include all desirable safety features. Instructional adequacy means appropriate space in which children, guided by competent teachers, will live and learn together and grow as individuals—physically, mentally and socially.

To grow physically, children need ample indoor and outdoor facilities suited to their varying ages and sizes. They need also to eat balanced, appetizing meals prepared in adequate kitchens and served in attractive cafeterias.

To grow mentally, children need to work and study in large, pleasing, well lighted and ventilated classrooms, libraries and laboratories, with equipment and instructional materials suited to their maturity levels.

To grow socially, developing wholesome personalities and learning to live democratically, children need large spaces for group activities; small spaces where noisy or quiet work can take place without disturbance to others; and appropriate facilities for developing creative expression.

Needs of the School Staff

Indirectly affecting the growth of children, but just as important, are the needs of school staff members. Conference rooms for meetings with parents and other staff members; storage spaces for instructional materials; filing facilities for records and reference materials; spaces for preparation of materials; rooms for relaxing during the school day—all contribute to staff



A functional and attractive foods laboratory can be created in an old building, replacing worn out and old-fashioned equipment and fixtures.

efficiency and subsequently to a better instructional program.

More specifically, attention to instructional adequacy means planning with teachers, principals, supervisors and other school staff members who know the requirements of the educational program and who can interpret them in terms of the needed physical facilities. For example, in the Denver program of modernization, home economics laboratories have been fitted with new unit kitchens, model dining rooms, expanded storage facilities and new furniture and equipment; industrial arts shops have been remodeled from the "ground up;" and shower and locker rooms have been rearranged and modernized to improve their function and to provide extra space for expanded physical education activities.

As each project was initiated, teachers, supervisors and school principals conferred with members of the planning, maintenance and engineering departments to establish the needs of the particular program and to determine the most economical way to modify existing facilities. After preliminary drawings were reviewed and general agreement reached by all concerned, working drawings with details of structural, plumbing, heating, ventilating and electrical work were prepared. These drawings became the basis for the work of contractors selected for each job by means of competitive bidding.

Although the most important outcome of this procedure is that of providing good facilities to serve the educational program, a secondary but none-the-less significant one is that of developing in teachers, coordinators and principals the feeling that they have had a significant part in the modernization program.

A filing cabinet, built to teachers' specifications can be added.





This space for an auxiliary gymnasium was "left over" after rearranging and modernizing a girls' shower and locker room. The space, once wasted, is now put to practical use.

Besides changes in the building structure itself, the modernization program must be extended to include a consideration of the furniture and equipment required to complete the job. In too many instances, furniture and equipment have been provided from funds which are left after everything else has been done. This "left over budget" arrangement seldom provides sufficient funds. Important to this program are the same basic principles of planning and cooperation which characterize the overall modernization program.

In summary, it seems important to emphasize that there are many ways to improve the function of existing buildings through a well organized and executed modernization program. Old buildings *can* be made safe, comfortable and functional. Boards of education must be willing to provide the necessary funds for a complete program.

Spend Money Wisely

Further, it is the responsibility of school staff members to spend wisely and economically the available money by utilizing the creative ability, skills and knowledge of architects, contractors, teachers, custodians and other school personnel. The modernization program can be made to solve at least a part of the problem of housing our children in satisfactory schools.



A student is operating the filmstrip projector for an eighth grade class in the Wichita, Kansas, schools. A portable screen is used.

Wichita, Kansas, Public Schools

PRACTICES IN AUDIO-VISUAL EDUCATION AND SERVICES

by ALPHONSE HENINBURG

Director of Audio-Visual Services, West Hempstead Schools, West Hempstead, Long Island, New York

PHILOSOPHIES and major objectives of audio-visual programs differ from school system to school system. So, too, do the spaces and facilities provided for audio-visual education differ. Many school districts employ audio-visual education directors and have established central instructional materials centers to implement their programs.

The writer has received the gratefully acknowledged cooperation of 25 selected school districts in 18 states and the District of Columbia in compiling data on the audio-visual facilities and practices now prevalent in the respective locations. These school districts range in size from 69 teachers and 1,810 pupils to 14,083 teachers and 624,354 pupils. All figures relate to the school year 1953-54, as reported by audio-visual directors in reply to the writer's check sheet request.

While it is recognized that the holding of a higher academic degree is in itself no guarantee of good teaching or administration, it is generally believed that the degree makes a good yardstick by which to determine effective teaching. It is comforting to note that A-V directors in the 25 school districts are more than keeping pace with other areas of education in the public schools. They have reported the following academic degrees:

Bachelor's degree	2
Master's degree	17
Master's, plus one year or its equivalent	3
Doctor's degree	3

Although no attempt was made to determine the number of years of experience in A-V programs, one director indicates "thirty years' experience" in this field.

The extent to which boards of education look upon audio-visual programs as being important in the edu-

cative process may to some measure be estimated by the salaries paid to A-V directors. No attempt is made here to ascertain salary levels as such, but we are interested to know how the salary of the A-V director compares with that of teachers in the same system.

Five directors are paid on the same basis as other teachers. Of these five, three are holders of the doctor's degree. It is probable that boards of education, noting that the higher degree entitles A-V directors to a higher salary, are reluctant to increase the amount of that salary because of the nature of the responsibility involved. Two of the 25 reporting are paid slightly higher



Grosse Pointe, Michigan, Schools

Every fall in Grosse Pointe, Michigan, A-V nights are set up in each building. New teachers then learn how to operate the audio-visual equipment.

salaries than teachers, while six are paid appreciably higher salaries. Of the remaining 12, three are paid at the supervisory and administrative level. One receives $400 more than teachers; another 20 percent more "in addition to a travel account"; a third "80 percent more than teachers," while the most fortunate salary-wise is paid $2,000 more than teachers. Although no attempt was made to determine the amount of work performed by the director, one respondent pointed out that he "works four weeks longer each year than does the typical teacher."

What Clerical Help Is Available?

In at least one of the districts much of the program bogs down because of the lack of clerical help. This director reports that so much of his time is spent in routines which could be performed by a clerk that he has little time left for work with teachers, or for creative development of the A-V program. Fortunately, this condition is the exception rather than the rule in the other 24 districts.

One director has the half-time services of a clerk, another has such services for three-fourths of the time, while the others report one full-time person. The most fortunate district in this regard is one in which a "librarian-secretary" is employed. Such a combination of skills must mean greatly improved services in the district. In approximately one-half of the districts, student help supplements that afforded by adult personnel. One director indicates that he has "almost enough" clerical help, and another reports that his clerical help is "adequate." In Los Angeles, with a clerical-maintenance staff of 61, the ratio of this staff to the number of teachers in the system is 1:238. It is recognized, of course, that small school districts would find it difficult to maintain the same ratio.

Who Serves as Projectionist?

Nearly all of the teachers in the elementary schools of the 25 school districts operate A-V equipment. In the high schools this responsibility is generally carried by pupils. In-service workshops of one type or another are maintained by practically all the districts. In two instances, a 2-point course in audio-visual education offered by a neighboring college is required of all teachers. In answer to the question: "Do both boys and girls operate A-V equipment," we found that only three districts exclude girls from this experience. Both boys and girls serve as projectionists in the remaining 22, with more boys reported as operating the equipment.

Pupil projectionists are chosen, following their training period, in a number of ways; paper tests coupled with tryouts on the job are the most generally used. In several districts, the beginner is paired with an experienced projectionist until he has developed competence.

In six of the 25 districts reporting, no program credit of any kind is given to pupil projectionists. At the

Wall cupboards and shelves provide storage space in the workroom of the Mankato, Minnesota, Department of Audio-Visual Instruction.



Mankato, Minnesota, Public Schools



In West Hempstead, Long Island, New York, a tape recording is made of the proceedings of the Board of Education meeting.

other extreme, two districts allow a maximum of one unit in the high school, and one of these grants honor points in the elementary school. A wide variety of practices is followed in other districts: the issuing of awards; the granting of letters; and membership in school service clubs.

Audio-Visual Equipment

In the accompanying table we show, on a comparative basis, the extent to which ten selected items of audio-visual equipment are owned by the 25 districts represented in this study. The ten items which are included do not duplicate those found in other tables. We find that there is little correlation between the number of pupils or teachers in a given district and the number of items owned. Every district owns at least one film-splicing unit, but one district with more than 40,000 pupils owns two of these units; while

Report on Ten Audio-Visual Equipment Items in 25 School Districts

No. Teachers	No. Pupils	16mm Films	Film-strips	Slides	Film Editors	Splicing Units	Radios	Tachisto-scopes	TV Receivers	Cameras: 35mm	Cameras: 16mm
300	8,000	320	1,800	400	1	5	130	1	0	3	2
1,600	38,000	1,660	1,820	21	0	3	260	0	3	0	0
2,900	90,000	1,195	3,068	8,000	0	20	443	2	0	2	4
1,785	43,000	2,006	6,893	160	2	2	—	1	—	—	—
476	11,808	450	800	600	0	7	18	1	0	1	2
210	5,200	175	1,000	600	0	3	25	0	0	1	2
3,588	105,578	2,214	—	0	1	4	270	6	0	0	0
629	14,929	220	1,000	3,000	2	4	24	1	0	18	3
228	6,600	90	600	600	—	6	0	5	0	0	0
397	8,162	500	2,000	2,000	3	15	50	2	0	12	1
425	12,000	336	1,000	1,500	1	4	35	2	3	3	1
650	18,903	450	700	2,000	1	10	20	1	0	1	3
14,083	624,354	21,000	47,000	160,000	1	15	2,500	65	0	3	1
362	8,500	250	1,000	2,000	1	3	13	4	0	4	1
1,900	55,000	750	1,000	150	1	10	460	4	3	1	3
900	20,500	609	1,092	25	1	2	51	1	0	3	0
417	11,000	800	500	2,000	6	12	0	1	0	3	3
2,940	86,000	6,725	4,270	1,000's	15	90	325	2	0	25	10
290	7,450	465	2,000	350	1	5	17	2	0	2	3
69	1,810	0	500	369	1	1	11	0	0	1	0
135	3,200	75	700	100	1	2	3	1	0	1	0
4,000	96,700	3,018	5,000	1,750	1	4	—	45	—	"Many"	—
2,410	70,000	1,029*	1,300	—	2	15	250	5	0	10	5
200	—	40	485	50	1	4	4	0	2	1	1
305	7,500	113	3,000	200	0	5	10	2	0	1	2

*The district owns several prints of each title.



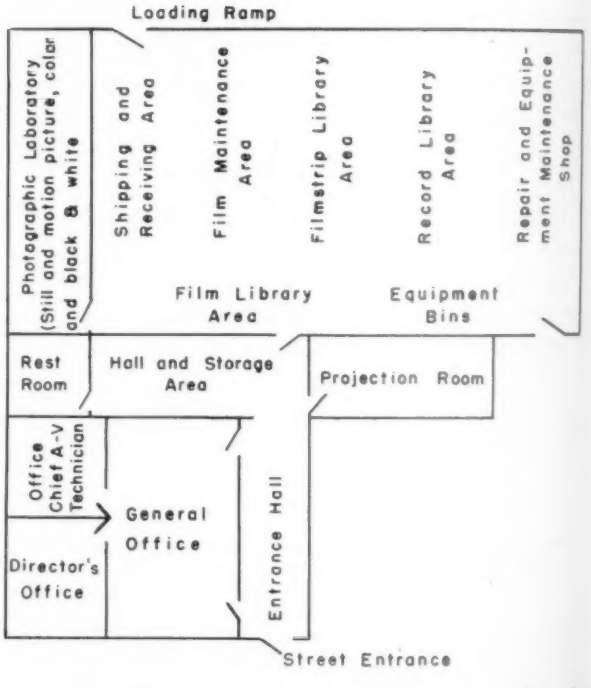
In the Department of Audio-Visual Education of the Atlanta, Georgia, Public Schools, all types of A-V equipment are stored in special shelves and compartments suited to the size and shape involved.

another, with 7,500 pupils, owns five. It is evident that in some districts the splicing of film is done in the central office, while in others each building has its own equipment for this job.

As is to be expected, there is wide variation in the number of 16mm films owned. The distance from film rental libraries and the number of times a given title is in demand each year are among the factors to be considered. Many directors prefer to rent the greater number of films used, and to purchase only those for which there is consistent demand over a period of years. The recent reduction in parcel post rates for the shipment of films is an added incentive for renting rather than purchasing films. Thus, an accurate count of the number of films owned by a school district may give no conclusive estimate of the number of film showings per year in that district.

The number of radios owned is also a suggestive rather than a conclusive indication of the extent to which pupils may listen to the radio during school hours. Many schools now have central public address systems, which provide for radio listening in each classroom. This, of course, cannot be considered a substitute for the radio in the classroom, since it cannot provide the variety of programs that may be desired.

It is probable that there is a direct relationship between the number of slides and the number of 35mm cameras owned. Our returns, however, make no distinction between the number of 2 by 2 slides, and the number of lantern slides. Nor have we ascertained the extent to which the slides owned were purchased or produced by pupils and teachers in the school district. In the writer's opinion, more and more schools will use the 2 by 2 slide in the A-V program both in the school and in the community.



Floor plan shows the various areas of Atlanta's Department of A-V Education.

Comparing Amounts of Equipment

We have also compared the A-V items now in use in fifteen school districts with recommendations made in two earlier studies. The first of these studies is by the National Committee of Fourteen, whose findings were reported in the October, 1947, issue of *See and Hear*. The second study consists of recommendations by the Visual Education Committee of the American Council on Education, "A Measure for Audio-Visual Programs in Schools." This report was prepared by Helen Hardt Seaton in 1944.

Determinants Used in Two Comparative Studies

Type of Equipment	Committee of "14" Determinant Per Classroom Ratio	American Council on Educ. Determinant Per Pupil Ratio
16mm Projector	1 per 10	1 per 200
Filmstrip Projector	1 per 5	1 per 200
2 x 2 Slide Projector	1 per 5	1 per 400
3¼ x 4 Slide Projector	1 per 5	1 per 400
Opaque Projector	1 per 10	1 per building
Screens	1 per classroom	1 per classroom
Record Players; Dual Speed	1 per 5	1 per 200
Tape Recorders	1 per 25	No Ratio Given

In analyzing the comparative figures shown here, several factors must be kept in mind:

1. Tremendous advances in the utilization of A-V materials have been made since these studies were completed.
2. There is wide variation in the number of items suggested by these two studies. The ACE study generally suggests a larger number of 16mm projectors, while the "14" study generally proposes more 3¼ by 4 projectors.
3. In those districts in which an appreciable number of pupils are on double session, the ratio based on number of classrooms is likely to be more accurate than that based on the number of teachers in a system. For example, the equipment which is used in a given classroom for a morning session may easily be used again for the afternoon session in the same room.

To illustrate our comparative interpretations, let us consider the number of 16mm projectors. In the accompanying table the "14" column shows that School District A. should have 40 of these projectors—one for every ten classrooms in the district. The ACE column indicates that the district should have 60 projectors—one for every 200 pupils in the district. The third column shows that the actual number of 16mm projectors now in use in the district is 42.

Comparing Number of 16mm Projectors In 15 of the Selected School Districts

School District (Coded)	Committee of "14"	Amer. Council on Educ.	Actual Number
A.	40	60	42
B.	—	37	24
C.	380	483	223
D.	100	450	161
E.	20	26	17
F.	183	265	163
G.	29	27	26
H.	13	16	21
I.	160	190	87
J.	30	40	30
K.	43	55	45
L.	5	9	5
M.	29	37	24
N.	72	102	98
O.	12	—	9

A more detailed analysis of the comparative figures may indicate the trend to be expected in other school districts. A brief analysis of the findings under each of the seven A-V items for which information is available in one or both of the two earlier studies mentioned above follows.

16mm Motion Picture Projectors:

Five of the 15 school districts have more of these projectors than the minimum number in the smaller of the two proposals, and two districts exactly match that minimum. Of the remaining seven, four approximate the smaller of the suggested minimum standards, while the last three show 54 percent, 57 percent, and 62 percent respectively of the lower minimum proposed. In no instance does a district possess a larger number of these projectors than is suggested by the larger of the two minimum equipment studies.

Comparing Number of 2x2 Projectors In 15 of the Selected School Districts

School District (Coded)	Committee of "14"	Amer. Council on Educ.	Actual Number
A.	80	90	35
B.	—	55	37
C.	760	724	279
D.	200	675	133
E.	40	39	33
F.	376	396	201
G.	58	40	22
H.	26	24	17
I.	320	285	76
J.	60	60	65
K.	86	82	52
L.	10	13	6
M.	58	55	35
N.	144	153	102
O.	24	—	10

Filmstrip and 2x2 Slide Projectors:

It is interesting to note that in one district (Code J.), the number of these projectors suggested by the Committee of Fourteen study and that of the American Council on Education is identical. Further, this is the only district of the fifteen which owns more projectors than either minimum proposes. Since these projectors have been in general use a much shorter period of time than have the 16mm motion picture projectors, it is to be expected that the lag in acquisition would be much greater.

While the present study made no provision for

answering this question, it would be significant to determine the *rate* at which the several districts are meeting approved standards in this regard. The fact that these projectors are relatively inexpensive, and that the availability of excellent filmstrip is increasing at a rapid rate, would suggest that school districts would soon meet, and even surpass, the minimum suggested by the two studies with which comparison is being made. The simplicity of operation of these projectors, and the fact that a given image may be studied at great length, are likely to be factors in determining the number to be purchased.

3¼x4 Projectors:

In no school district has the purchase of 3¼ by 4 projectors kept pace with the minimum suggestions included in the two studies with which we are comparing present findings. The growth in popularity of the filmstrip projector and, more recently, developments in the overhead projector, have probably tended to reduce the number of "lantern slide" projectors in the several districts. A casual examination of the figures suggests that a higher percentage of 3¼ by 4 projectors is found in the older school districts, while the number acquired by newer communities has been relatively small.

The fourteen school districts which reported on this item now own a total of 170 of these projectors. This figure is in sharp contrast to a minimum suggestion of 1,871 by the Committee of 14, and the 763 suggested by the American Council on Education.

Comparing Number of 3¼x4 Projectors In 15 of the Selected School Districts

School District (Coded)	Committee of "14"	Amer. Council on Educ.	Actual Number
A.	80	30	12
B.	—	18	2
C.	760	241	67
D.	200	225	58
E.	40	13	4
F.	376	132	—
G.	58	13	5
H.	26	8	2
I.	320	95	70
J.	65	20	4
K.	86	27	5
L.	10	4	2
M.	58	18	2
N.	144	51	3
O.	24	—	4

Opaque Projectors:

The opaque projector, more than any other equipment included in the present study, requires a darkened room for best results. This means that only gradually will school districts be able to acquire and use them effectively. Then, too, like the filmstrip projector, it has greatly increased in popularity because of recent improvements. When we remember that the older opaque projectors have tended to become obsolete at a more rapid rate than motion picture projectors, the contrast between the number now in use and the expected minimum projected by the National Committee of 14 study is all the more striking. The combined total of opaque projectors expected by the "14" study is 1,116, while the actual number is 320. This means that slightly more than 29 percent of the suggested number are now in use.

Comparing Number of Opaque Projectors In 15 of the Selected School Districts

School District (Coded)	Committee of "14"	Actual Number
A.	40	6
B.	—	12
C.	380	70
D.	100	33
E.	20	9
F.	183	46
G.	29	13
H.	13	6
I.	160	37
J.	30	8
K.	43	6
L.	5	2
M.	29	19
N.	72	49
O.	12	4

Screens:

In regard to screens the American Council on Education study and that of the Committee of 14 are in

Comparing Number of Screens In 15 of the Selected School Districts

School District (Coded)	Committee of "14"	Amer. Council on Educ.	Actual Number
A.	400	400	220
B.	—	—	85
C.	3,800	3,800	600
D.	1 000	1,000	160
E.	200	200	40
F.	1,830	1,830	—
G.	292	292	80
H.	134	134	—
I.	1,600	1,600	56
J.	300	300	155
K.	425	425	56
L.	45	45	9
M.	290	290	95
N.	722	722	473
O.	114	114	21



Many types of specialized equipment aid the repair man in the Equipment Maintenance Section of Atlanta's Department of Audio-Visual Education.



School children take part in broadcasts by radio station WABE-FM, operated by the Atlanta, Georgia, Board of Education.

Atlanta, Georgia, Board of Education



A steady stream of films comes and goes, reaching all parts of the school system from the Film Shipping and Receiving Section.

complete agreement. Each suggests that there should be a screen in every classroom. Evidently the feeling is general among the districts reporting in the present study that one screen per classroom does not represent an urgent goal. There is no district which even nearly approaches the objective of one screen to the classroom. One district with 1,000 classrooms reports 160 screens; another with 3,800 classrooms has 600; while a third with 1,600 classrooms has 56 screens. Two of the 15 districts have screens in more than one-half of the classrooms in the entire district. Since the 15 districts represent a total of 11,152 classrooms and report a total of 1,965 screens, this means that approximately 17 percent of the rooms represented are provided with screens.

What actually happens, of course, is that in many instances portable screens are moved from one room to another and set up with the A-V equipment. Our returns show that of a total of 1,965 screens in use in the fourteen districts in which comparison could be made, 862 are portable screens.

Three-Speed Record Players:

The comparison on number of record players is not accurate. The figure indicated in this study refers to 3-speed record players, while the earlier figures indicate the dual-speed machine. At the time the two other studies were completed, the dual-speed machine was in general use, but is now being replaced by the 3-speed player.

Comparing Number of 3-Speed Record Players In 15 of the Selected School Districts

School District (Coded)	Committee of "14"	Amer. Council on Educ.	Actual Number
A.	80	60	46
B.	—	37	50
C.	760	483	1,120
D.	200	450	455
E.	40	26	18
F.	376	265	—
G.	58	27	93
H.	26	16	7
I.	320	190	131
J.	60	40	72
K.	86	55	50
L.	10	9	4
M.	58	37	110
N.	144	473	381
O.	24	—	—

If there seems to be a great lag between expectancy and actuality, there is ground for encouragement when we examine the figures on record players. The number now in use exceeds the minimum in each of the other studies. Two school districts have more than twice as many as might have been expected, while a third shows 1,120, when the comparable American Council on Education figure is 483.

Comparing Number of Tape Recorders In 15 of the Selected School Districts

School District (Coded)	Committee of "14"	Actual Number
A.	16	1
B.	—	9
C.	152	146
D.	40	31
E.	8	7
F.	—	—
G.	12	13
H.	5	16
I.	64	29
J.	12	14
K.	17	6
L.	2	1
M.	12	20
N.	29	65
O.	5	6

Tape Recorders:

Information on both wire and tape recorders was obtained in the present study, but only the figures for tape recorders are shown. The figure for wire recorders was eliminated because purchases and replacements now generally request the tape rather than the wire. Under this item, two interesting extremes are found: one district, which may be expected to have 16 of these machines on the basis of the "14" study, has only one machine; while another, which could be expected to have 29, actually has 65. The totals for the entire 14 districts are more nearly similar for tape recorders than in any of the other five items. The expected figure is 374, while the actual figure is 355.

The Goals Are Much the Same

We may conclude from this status study that in both large and small school districts there is an awareness of the value of the audio-visual program, as well as an attempt to provide a wider range of facilities and services.

In almost every instance, plans are in the making for substantial constructive change during the next two or three years. In general, the goals toward which the several districts are working are very much the same. There is as yet, however, no unanimity of opinion as to standards to be met where equipment is concerned.

The problem which seems to receive universal attention is that of room darkening. It is evident that much work must be done with architects and with local boards of education before the conditions sought by most audio-visual directors can be attained.



Audio-visual aids date far back into antiquity. Instructional materials such as objects, models, specimens, pictures, verbal and visual symbols, crude maps and charts have been used for thousands of years.

FOR TODAY'S CLASSROOMS— AN ORGANIZED AUDIO-VISUAL AIDS PROGRAM



by J. V. LaCLAIR

Director of Instructional Materials, Klamath Falls Public Schools, Klamath Falls, Oregon

Mr. LaClair's varied activities in education include teaching in elementary and high schools, work as a college instructor and positions as elementary and high school principals and as a sub-district superintendent of schools. He received his B.S. degree from Southern Oregon College of Education and his M.Ed. from Oregon State College.

TODAY the term "audio-visual" is as meaningful in education as the term jet propulsion is in warfare. The theory of audio-visual education no longer needs proof and demonstration by costly experiments and extensive research. The facts are already at hand; the time for proving the value of visual aids is past. It now remains to apply the findings to the educational needs of the classroom.

The transition from a research period to that of practical application required careful planning. During the past ten years the audio-visual program has been clarified and has superseded the approach to education characteristic of 100 years ago. But the planning, preparation and development of a successful audio-visual program requires a thorough consideration of the basic problems involved. Only when we have laid a solid foundation on tried and true principles can we expect to build a successful future in this phase of educational programming.

The attempt to establish an audio-visual aids program usually involves four basic problems: (1) "selling" the program to the public and school personnel; (2) securing funds for its development; (3) procuring a leader for its administration and supervision; and (4) applying the actual mechanics of the program.

Solving These Problems

The solutions to these four problems are the important keys to a successful and expanding program of audio-visual education. When we consider that the classroom teacher is the pivotal point in an educational program, we realize her importance in the solution to these problems. If a teacher has not had training in this field, does not fully realize its value, or does not have easy access to an adequate supply of workable equipment and usable materials when she needs them, audio-visual aids are doomed to become merely "audio-visual entertainment." In many instances audio-visual aids, so called, have been reduced to just this—a time waster for students. It has been proven, however, that through

correct usage of an adequate supply of audio-visual aids students will learn more quickly and thoroughly and retain longer what they have learned.

Public and Teacher Acceptance

Usually the school administrator knows the value of audio-visual aids; but many schools still do not have an adequate supply of workable equipment and usable teaching materials. The fault lies in the fact that teachers and the public have not been convinced of the value of these materials to daily classroom activities.

Pioneers in the field have spent many years in an attempt to establish this program under the term, "audio-visual," and have failed. Some leaders have discarded this term for the more understandable, more inclusive "instructional materials," and under this label have gained favorable reception with little effort.

Actually, the only difference between audio-visual aids and instructional materials is this: audio-visual aids include all teaching materials from which learning is gained through the senses of hearing and seeing—such items as textbooks, objects, models, specimens, maps, charts, globes, flat pictures, projected still pictures, motion pictures, verbal and visual symbols, radio, recordings, television, etc. Instructional materials include all of the above plus any other teaching aids from which the student may gain knowledge through the senses of taste, smell and touch. Statistics show that about 93 percent of everything we learn is through the combined senses of hearing and seeing, i.e., audio-visual; while only about 7 percent is learned through the other three senses.



All records which are stored away should be catalogued.

Since the general public and the majority of teachers more easily understand and accept the term "instructional materials," it seems a needless effort to insist on using the term "audio-visual."

Audio-visual aids are not as new as many would contend. They date from far back in antiquity. Instructional materials such as objects, models, specimens, pictures, verbal and visual symbols, crude maps and charts have been used in educational programs for thousands of years; most of them were educationally employed as far back as 23 centuries B.C., when formal education began.

It is true, however, that some very important additions have been made to the teacher's kit of tools during the past thirty years—the sound motion picture, the magnetic recorder, radio and television. It is not unreasonable to assume, then, that the next thirty years may add even more effective teaching tools to the present supply.

Problems of Finance

The second problem, finance, can be easily solved if the "selling" program has been successful. Unfortunately, many school administrators believe that audio-visual aids or instructional materials are supplemental devices—to be added to the classroom only if time and money permit after fundamental equipment has been provided. But this is not the case.

Teaching materials or teaching tools mean as much to the teacher as hammer and saw do to the carpenter. It is no more reasonable to ask a teacher, equipped with only a bare room, to prepare students for their place in today's society than it is to ask a carpenter, without tools of any kind, to construct a new cabinet from rough lumber.

In the education of students audio-visual aids are second in importance only to the classroom teacher, and should be the number two item considered when the budget is planned.

The Administrator and Supervisor

When teachers and the public are receptive to the program and funds are available, the next obstacle to overcome is the finding of a qualified director to take charge.

His qualifications should include an interest in education in general—in this field in particular, broad teaching experience at both elementary and secondary levels, selling ability, mechanical aptitude and interest, with some successful experience as a school administrator and supervisor. Creativeness, popularity with his fellow workers and civic mindedness would be welcome assets.

The Library of Materials

When the first three problems have been over-

come, the development of a library of materials remains as the least difficult step. Its importance must not be minimized, however, since the success or failure of such a program is directly related to the quantity and quality of materials in the library.

Too many programs have failed because the administrator was primarily a motion picture advocate or a filmstrip man. The director and administration are responsible for making available to teachers all types of teaching materials regardless of the director's special interests.

Pioneers 100 years ago faced the problem of expediency; how to construct quickly a building for shelter from the elements and protection from Indians. These early carpenters provided rough lean-tos and cabins from logs, shakes and thatch, using only a saw,



Important additions have been made to the teacher's kit of tools during the past thirty years—the sound motion picture, the magnetic recorder, radio and television.

an axe and a hammer. Our modern homes must not only fulfill the primary purpose of sheltering but must also be attractive and convenient for living. Their construction require tools of greater variety and more complexity.

So it is with the student of today. The demands of society require citizens with a broader knowledge of the arts and sciences; the student of our age is confronted with a much more complicated curriculum in school than that which challenged pupils of 100 years ago.

Teachers, therefore, must be equipped with a variety of teaching tools and must be prepared to use them well if they are to fulfill their responsibilities. The materials library should provide these tools—books, maps, globes, charts, objects, models, specimens, still pictures, motion pictures, etc.—as they are required by the teacher.

The materials library should be a "service station" equipped to supply materials, equipment and services without undue inconvenience to the teacher.

Equipment Needed

It is advisable to purchase standard makes of projectors, phonographs, radios and other mechanical equipment of a plain design that will give satisfaction in terms of quality and durability. Standardization of one or two makes will allow the department to stock an almost complete supply of parts while maintaining a low inventory. This would not be possible if a wide variety of models were used.

Another advantage of standardizing on only one or two models of machinery is evident in teacher transferals. When a teacher works in two or more school buildings she will not be confused by various methods of operation.

Room darkening draperies, electrical outlets and plenty of bulletin board space are essential if teachers are expected to make use of audio-visual materials and equipment.

Distribution of Materials

If instructional materials are not easily available to teachers when they are needed, the aids will prove to be of little value and teachers eventually will either stop employing them or will look to a source other than the materials center.

Daily delivery service is provided in many school systems, while in others only weekly delivery service is permitted. The daily schedule is preferred, and is no more costly than weekly deliveries, if properly managed. Many school systems with limited delivery service have accomplished outstanding success by stocking numerous copies, pieces or prints of each visual aid used. Thus, the availability of their material is relatively adequate.

Teacher Training

Only a small number of graduates of teachers colleges have been properly schooled in the use of audio-visual materials. This poses a tremendous problem for school administration.

Audio-visual aids courses in most teacher training institutions are taught by instructors unable to do justice to them. Many times the course is offered merely as a means of filling schedules or as a last resort. Experienced public school teachers should insist that instruc-

Oak Ridge, Tennessee, Public Schools



A home-made shadow box will allow individuals or small groups to view filmstrips in the library without having to darken the room.

tion in audio-visual education be ranked in importance with principles of teaching and similar courses.

Why, then, is this important area of preparation neglected in colleges? To suggest some possible explanations: few college instructors have taken the course themselves, and most of them use the "lecture method" of teaching with little if any actual use of audio-visual materials. It seems incredible that instructors of prospective teachers should have a limited understanding of this important program. Just as perplexing is the realization that administrators of teachers colleges are neglecting this phase of teacher preparation.

In recent years a few colleges have employed experienced personnel from the public schools to teach audio-visual courses. This, to some extent, has relieved public schools of the burden of training novices after they have been employed as teachers. It appears that this problem will be with the new teacher and the public schools for a long time to come. Through in-service training and close supervision the schools' audio-visual departments must do their best to train young teachers in the use of instructional materials.

The inexperienced teacher is not the only "problem" teacher the audio-visual director must spend long hours in training. Older teacher-transfers from other areas many times need this help just as much as do young teachers.

Supervision of the Program

In carrying out an audio-visual program teachers must know where to secure materials, which ones to use, how to use them, how to construct materials and where to have the equipment and materials serviced and repaired. It is necessary, therefore, that the audio-visual administrator and his staff provide helpful supervision at all times. If teaching in the classroom is successful, the entire educational program will be successful. This, in direct ratio, insures a successful public school since the main purpose of the public school is education.

Building for the Future

With all the world becoming audio-visual minded, schools should begin to plan, prepare and develop a comprehensive and coordinated program of audio-visual education. It is never too late to build for the future on the experiences of the past. The success of the audio-visual program in schools does not lie solely in an enthusiastic approval of the value of the materials. The future of the program depends on a well planned and executed program that provides for proper preparation of teacher personnel in audio-visual instruction, an adequate supply of useful materials and equipment at the time they are needed and good administration and supervision of the program.

These basic classroom problems of education are not easily or quickly solved. There is no insurance for success without considerable effort. The problems are a challenge that our schools can and will meet with proper determination.



Adequate attention should be given to study, working and teaching areas, with enough free space for a variety of activities.

MAKE ROOM FOR THE USE OF AUDIO-VISUAL AIDS



by EARL F. STROHBEHN

Director, Audio-Visual Education and Social Studies, Public Schools, Oak Ridge, Tennessee

Mr. Strohbehn has an A.B. degree from the University of Omaha and an M.A. from the University of Cincinnati. He has been an instructor, principal and director of audio-visual aids in various schools in Iowa, Tennessee and Canada. Mr. Strohbehn has also delivered special lectures at teachers colleges.

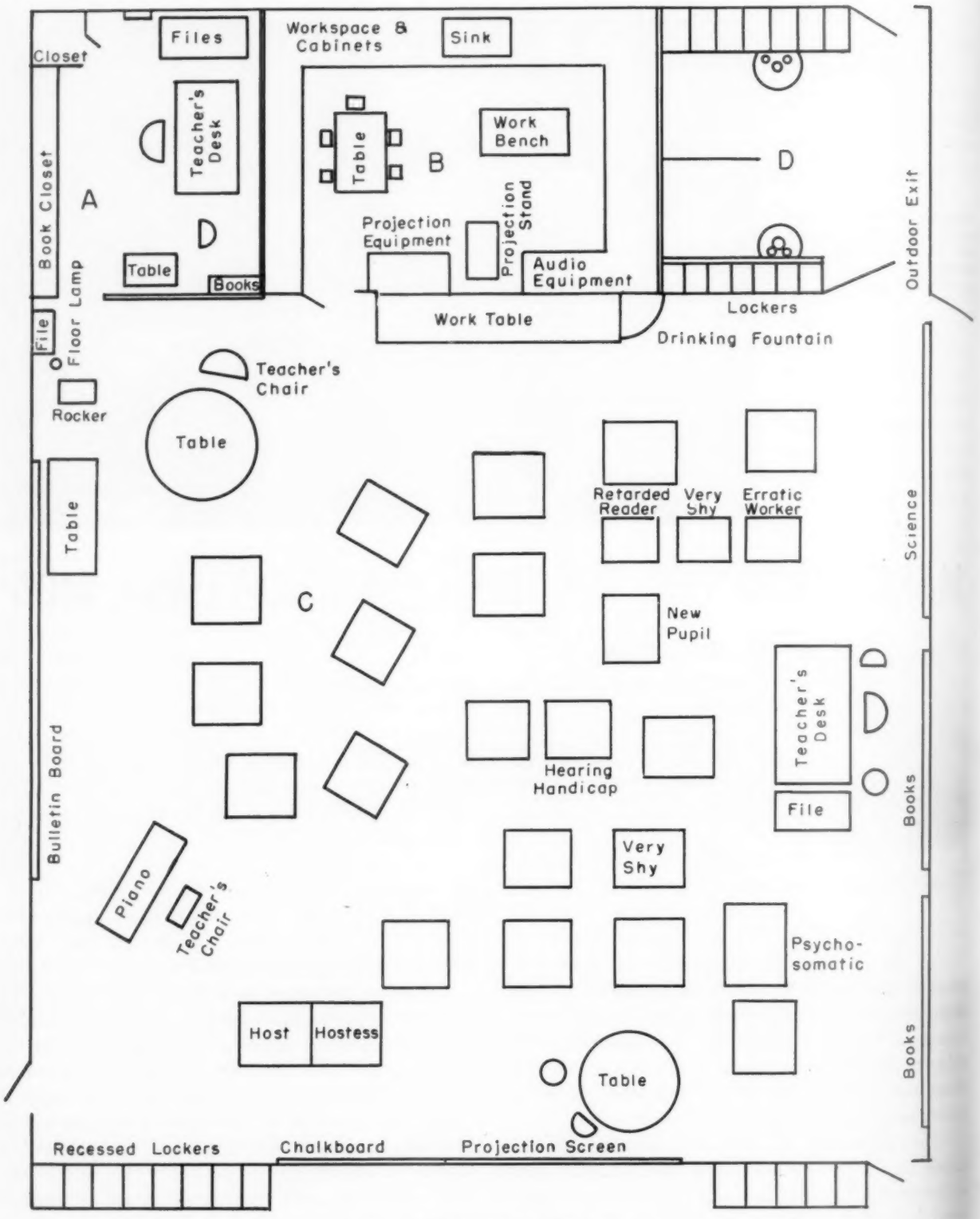
SCHOOLS are expected to aid each individual to develop, to the fullest extent, his talents, his ability to participate in decision making, his ability to understand his own capabilities and limitations, his ability to develop self-respect, to get along well with others and to be, as far as he is capable, a useful, healthy and competent individual in our society.

The fulfillment of this responsibility by the schools cannot be achieved unless the necessary tools are provided adequately in kind and in amount. Audio-visual materials are but a part, though assuredly an important part, of a larger whole comprising all instructional materials. These materials are interrelated and, if properly used, will supplement and complement one another.

There is an abundance of excellent material on the technical details relative to space and facilities for the use of audio-visual materials. Previous editions of this yearbook contain many treatments on the various problems involved in providing adequately for such needs.

The Department of Audio-Visual Instruction of the National Education Association has recently published a series of bulletins entitled, "Planning Schools for the Use of Audio-Visual Materials." These bulletins contain detailed information and illustrations for all types of audio-visual needs in the classroom, auditorium and instructional materials center. Most of the publications related to schoolhouse planning likewise contain sections related to audio-visual requirements in terms of housing, equipment and other physical needs.

What is not quite so obvious from these sources are the basic concepts that relate spaces and facilities to the improvement of instruction through effective utilization. Here, then, the emphasis will be on the interrelationships of spaces, facilities and equipment with educational methods and objectives. The more technical details for audio-visual spaces and facilities are available in the references cited above.



Equipment requirements for this plan are:

Room A

Teacher's desk
Teacher's chair
Vertical file
Guest chair
Waste container
Small table
Straight chair
Bookcase
Magazine rack

Room B

Table and chairs
Workbench and tools
Projector cart
Projection equipment
Audio equipment

Room C

Single unit table desk
2 round conference tables
Teacher's desk and chair
Filing cabinet
35 student chairs
Piano
Rocker and floor lamp
Vertical file
Portable easel, table

Provisions for space and facilities, not only adequate in amount but also in arrangement and distribution, are equally as important as technical excellence in equipment and materials. Each must support the other if maximum efficiency is to be achieved in living and learning in the modern school.

Classroom Space and Facilities

The classroom proposed here should be part of a single story elementary school. It would provide safety, comfort, flexibility and economy in movement and time. Each room has an outdoor exit to playground facilities. The school facilities provide special instructional rooms for physical education, art, music, shop, homemaking, and an instructional materials center. These special facilities supplement and do not replace the classroom facilities and instructional program.

Authorities recommend a minimum of thirty square feet per pupil for intermediate grades, more for primary and kindergarten. The classroom suggested here will have considerably more space because of the emphasis on an exploratory type of program with a wide variety of activities and a broad usage of many different instructional materials.

Natural bilateral lighting and artificial lighting would assure a minimum of 25 to 30 foot-candles available at all times. Radiant heating is provided together with proper ventilation. The color dynamics should provide harmony and unity and a suitable atmosphere for children. Attractive pull drapes, easy to operate, and controlling light for projected aids, would also enhance the acoustical qualities of audio aids. The ceiling should be properly acousticized.

The main spatial arrangements of this proposed room would provide the following: A, the teacher's office; B, combination workroom, audio-visual aids control room and committee room; C, main classroom; D, toilet facilities shared with adjoining room. Transparent partitions separating rooms A and B from C would enable supervision by the teacher under all conditions from any place in the classroom. Pupil lockers with proper ventilation should be recessed.

Permanent storage space is provided in the teacher's office, in the workroom and in the classroom. There are electrical outlets at both ends and one side of the classroom, in the teacher's office and in the workroom. Audio controls outlets for projectors, record players, etc., are available at both ends of the classroom and in the workroom. Central sound, if provided, is wired into ceiling speakers. Telephone facilities for intra-school communication and outside connections would be located in the teacher's office.

Attractive pull drapes, such as those installed in the Woodland Elementary School in Oak Ridge, Tennessee, are easy to operate and also enhance a room's acoustics.

Gordon Studio





By rearranging furniture groups of children and the teacher may form an activity corner for the use of audio-visual materials.

The Elementary School Classroom

In designing classrooms we must look to the teacher and the students and what they propose to do for clues in providing desirable space and facilities. The accompanying general layout for an elementary classroom attempts to clarify the interrelationship of space and facilities with educational objectives. Areas and equipment are manipulated to meet individual and group needs and to capitalize on the vast potentialities of audio-visual materials through a minimum of disturbance and effort.

It is not intended that this layout should spell out every detailed specification; its purpose, rather, is to express and propose ideas deemed useful in improving instruction. It remains for the professional and creative architect to properly spell out dimensions, arrangement and distribution of space and facilities to accommodate best the objectives outlined.

Whether the classroom is to be rectangular, square, L-shaped or some other shape, can best be determined by the architect and local educational leaders when all the facts pertaining to each local situation are known.

The layout shown here reflects the basic concept of a self-contained classroom. Specialized help may be secured in music, art, physical education, guidance and from the instructional materials center, but primary responsibility for the educational growth of the students in this classroom is with the teacher.

Properly conceived, the classroom is a laboratory for living and learning. Working spaces for individuals and small groups, as well as for the whole class, are provided. Direct, purposeful experiences are a basis for developing generalizations and abstractions so useful in meeting future needs. This is the fundamental premise on which the use of audio-visual material is based. A thorough understanding of its implications is essential to planning desirable space and facilities for the use of audio-visual materials.



An instructional materials center may provide storage or museum space for various kinds of audio-visual aids. Included will be many three-dimensional objects.

Learning progresses naturally from things (operations) to ideas (language). Normally, the child has an experience and learns from his parents, playmates or teacher the language with which to indentify and communicate his experience; that is, he proceeds from experience to words, from words to ideas.

Classroom Reflects Principle

The classroom described here reflects this basic learning principle. Many opportunities are provided for children to utilize all their senses. To touch, to manipulate, to operate, to collect, to make things, to take part in plays, to observe exhibits and displays, to take field trips—all these are essential for effective learning. Such activities will illustrate and clarify in a concrete way the ideas and abstractions which are the ultimate objectives of an instructional program. They are the clues that must be considered in providing adequate audio-visual space and facilities.

Desirable audio-visual spaces and facilities mean more than mere physical qualities—proper and convenient electrical facilities, darkening devices for good projection, effective acoustical treatment, or adequate facilities that will enhance getting the right materials to the right place at the right time. It is all these and more. It is to think intensely in terms of how space and facilities will enhance the proper use of audio-visual materials in accordance with all that is known about how we learn. How we shape our school buildings will determine to a degree the type of learning experiences that will take place in those buildings.

It is imperative, therefore, that in planning spaces for the use of audio-visual materials in schools, the design of actual areas takes shape only after careful and thoughtful consideration has been given to how learning takes place, to the educational objectives sought, to the interrelationships of all instructional materials and to the potential competencies of those who will use these facilities—students, teachers and the community. When we have these ideals in mind then, through cooperative endeavor, they can be modified and applied intelligently in accordance with the practical demands of each local situation.

In-library listening with earphones greatly extends the use of various audio materials.

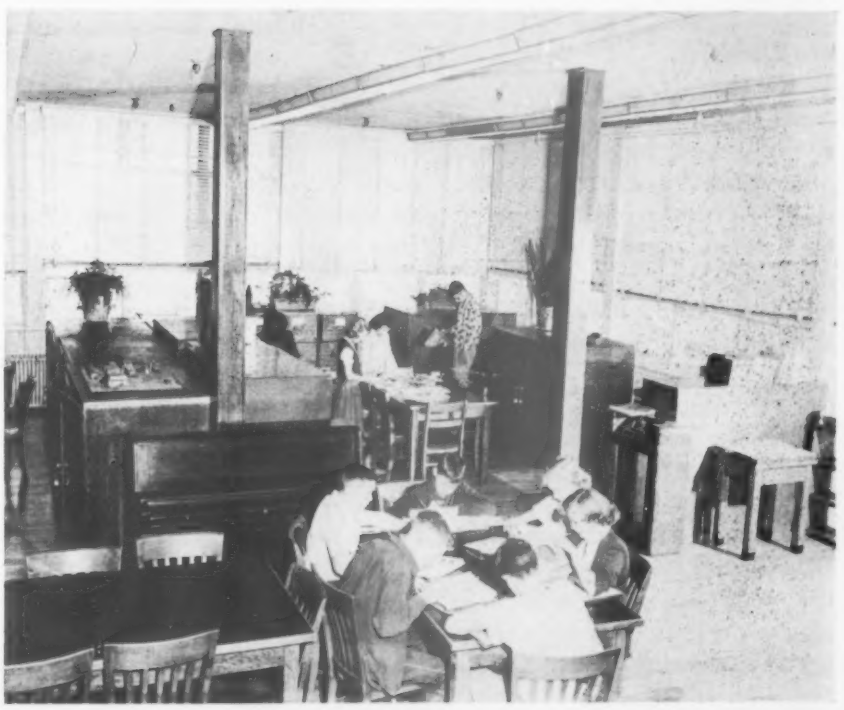


The AV Instructional Materials Center

The instructional materials center in modern schools, whether it be called a library, an audio-visual center or anything else, should be the nerve center around which the rest of the school is built.

With a greater percentage of children in school today than ever before, the range in abilities and interests of students has been extended tremendously. The teacher needs a great diversity of instructional materials, easily available to student and teacher alike, to stimulate learning activities that will insure maximum learning for all pupils. Adequate space and facilities

The library of a school can set up a materials bureau corner with adequate files for the prompt locating of all material available.





In the new Robertsville Junior High School in Oak Ridge, Tennessee, the director's office and the small conference room have glass partitions for better supervision of the pupils' activities.

must be provided in modern schools to house the vast array of materials so necessary to an effective instructional program.

It should be remembered, however, that such a center is more than space, materials and facilities. It is a well planned, flexible area housing selected materials and equipment of all kinds, and serviced by professional staff members who are dedicated to a program of the best possible education for the citizens of the community—children and adults alike.

In addition to the individual school centers, a central instructional materials center may be necessary to serve city or county systems. In some instances cooperative centers have been established serving several independent schools or systems.

The Oak Ridge Center

The instructional materials center of the Oak Ridge Junior High School is designed to service a student population of approximately 1,000. This center is a laboratory, the work and services of which are integrated with classroom activities throughout the school and with other educational activities in the community. Space and facilities for audio-visual materials and equipment are provided for in a manner that will encourage maximum usage.

The center is centrally located with respect to classrooms and administrative offices. It opens into the lobby of the main entrance to the building and provides the following spaces: main reading room with open stacks, circulation control, materials bureau, small conference room, director's office, workroom, preview room and audio-visual room for storage and handling of equipment. There are display cases and bulletin boards within the center and in the lobby adjacent to the center.

The audio-visual room has built-in cabinets and open shelves to store and service equipment. Direct entrance to the main corridor, as well as from the reading room, insures a minimum of disturbance in servicing classroom and in-library needs. There are projection carts for transporting the equipment. A small soundproof preview room that can be entered from either the reading room or audio-visual equipment room serves individual or small group demands for screening and auditing of audio-visual materials.

The materials bureau section in the main library houses non-book material. Here are found filmstrips, slides, records and transcriptions, tape recordings, flat pictures of all types and sizes, stereoscopic materials, maps, charts, clippings, pamphlets, objects, models and other third dimensional materials. All permanent materials are properly classified and catalogued on a wheel card file. Facilities to display maps and charts are such that these materials may be used either in the center or in the classroom. Space and facilities for in-library listening through earphones greatly extend the use of audio materials—records, transcriptions and tape recordings.

The director's office and the small conference room have glass partitions for supervision purposes. The workroom has the usual space and facilities for the processing and storage of new materials.

In the event that expansion in the instructional materials center becomes necessary, a present classroom adjacent to this center can be made easily and conveniently available. Located across the corridor from the audio-visual room and adjacent to the administrative offices is a small central sound room with glass panels which controls a larger conference room that also serves for radio productions and other audio needs.



Large drawer files were made in the school shop to house flat pictures. This provides a rich source of information on many subjects. Below, students are using a small conference room in the library as a special reading area.

Should the Library Be Separate?

Should library and audio-visual materials be housed separately? The trend seems to be toward in-





When all audio-visual materials are properly classified and catalogued on circular card files teachers and students are easily able to locate particular items.

tegration. However, many examples of programs separately staffed and housed can be found. The essential things to remember are: first, that capable personnel can be found to service such centers; and, second, that adequate and properly arranged space and facilities are necessary for use by pupils, teachers and members of the community.

Aside from the emphasis on physical facilities, it must be remembered that the instructional materials center essentially has a service function to perform. This requires well trained and efficient personnel. The local school administration must see to it that the personnel involved have enough time to carry out the objectives which rightfully can be expected of an instructional materials center.

The Auditorium

Though the classroom is the normal place for learning activities, as has been repeatedly emphasized, there are times when space must be provided for groups larger than the classroom accommodates. Arranging for the use of audio-visual materials in auditoriums is so specialized a task that those planning such facilities would do well to consult competent specialists in these areas. (Bulletin No. 2 in the series "Planning Schools for the Use of Audio-Visual Materials" by the Department of Audio-Visual Instruction, National Education Association, is concerned with the details of audio-visual performance standards for school auditoriums.)

School auditoriums equipped for audio-visual use will serve, as they have in the past, for the education of our populace in future emergencies. Audio-visual materials are proven means for effective, rapid communication. For civil defense needs, where quick mobilization and rapid learning may be necessary, one realizes how important the right audio-visual accommodations in auditoriums may become. It is much more economical to meet these needs at the time the auditorium is being built than at some later time.

The planning of school-community auditoriums should involve the thinking of all potential users. The expense can then be justified in terms of the actual needs. A well planned auditorium is an important educational asset in which most school communities invest with a feeling of value received. The arrangements necessary for the use of audio-visual materials can best be determined on the basis of local needs, evaluated and appraised by competent persons who know the necessary educational and technical details.

TECHNIQUES IN THE ECONOMICAL CONSTRUCTION OF EDUCATIONAL BUILDINGS



by FRED N. SEVERUD

Severud-Elstad-Krueger, Consultant Engineers, New York City

Senior partner of Severud-Elstad-Krueger, Mr. Severud has been a consultant engineer for such buildings as hospitals, research laboratories and centers, airports, housing developments, theatres and industrial buildings. He is a graduate of the Norwegian Institute of Technology, Trondheim, Norway. Mr. Severud has written many articles for architectural and engineering journals and has lectured widely.



and LESSING W. WILLIAMS

Partner, Geo. B. Post & Sons, Architects, New York City

Mr. Williams has degrees from Williams College and Columbia University, and has completed extensive study and travel in Europe. His experience includes design of schools, hospitals, banks, office buildings, residences and churches. Mr. Williams' paintings and sketches have been on display at Williams and Wellesley Colleges.

A YEAR or so ago we reviewed the most promising of the newer techniques in construction, as they related to school buildings. Since the art of building advances by gradual evolution rather than by spasmodic, revolutionary leaps, what is probably most important to the educator in a review of the latest progress is not so much whether some brilliant new idea has cropped up, but whether an idea, new a few years ago, has now come within his reach.

Construction is so complex and involves so many considerations, often compromising conflicting techniques, that even a new idea requires study and practice before the maximum benefit can be derived from it. The interaction of one material upon another, the adaptability of the structural frame to the best illumination, natural and artificial, the facilitation of the installation of mechanical work, the scheduling of all the many processes and installations, the economical use of machinery, equipment and man power—all must be coordinated if economies are to be genuine. There has been very definite progress in the familiarization of designers and builders with the new techniques, and their practical availability has become more widespread.

A member of a school board or a school administrator cannot hope to be able to evaluate matters so complex as these. What, then, can be said about structure that will be of use to them? Can any practical guidance be offered the educator in the difficult task of choosing the architect and engineer who, he hopes, will give his school the benefit of sound economical construction? If the designers are already selected, can the schoolman be aided to intelligently evaluate what they offer for his approval?

Questions regarding function for education and the creation of an environment that promotes the well being of the pupils, and also of the teacher (who has sometimes been forgotten in concentration upon pupils), are very often affected by suggested designs. The volume of recent research on the environmental aspects of the classroom is considerable, but the educator must be sufficiently acquainted with it to know when compromises are being made. Fortunately, we do not find that a scientifically developed classroom costs more than a conventional one.

Appraising the Architect's Skill

One is often asked how can an educator, being neither architect nor engineer, appraise a prospective architect's soundness in matters of construction? Almost any architect will be eager to show his progressiveness, if he is progressive. He also should be willing to discuss problems encountered with new constructions, such as how insulation and condensation are cared for, how the mechanical work is fitted in, whether the special building skills required are available in the vicinity, and whether there are matters that require close watching by him during construction.

Even without technical knowledge, a schoolman

Hedrich-Blessing



An economical factor in one story buildings like the Community Consolidated School for Palatine, Illinois, by Perkins and Will and Charles Klopp, is that fire safety requirements are less stringent.

should be able to determine the architect's conscientiousness and thoroughness, and his familiarity with relative costs. Thereafter a visit with the architect to buildings he has designed, that embody at least some of the economies he advocates and that he is asked to justify, will confirm the tentative judgment and possibly settle doubts as to the appearance of the economical construction. These need not necessarily be school buildings, for this part of the investigation concerns constructional ability rather than school planning.

When, later, different structural systems are being compared, it may be well to consider structural cost in relation to the permissible term of the bond issue. In many areas, long-term bonds are available for incombustible construction, with only shorter term bonds available for combustible buildings. Then the reduced annual burden on the taxpayer, with the longer term bonds, may justify an increase in initial costs. On the other hand, combustible construction generally is considered safe in one story schools having an exterior door from each classroom.

One of the greatest difficulties of the school board or building committee arises in deciding on the structural economy of different basic types of plan. Shall the new building be one story or multi-story? Advocates will be found for every type, from the spread out "campus" plan to the ultra compact "factory" plan, with widely differing opinions as to their relative cost.

One Story vs. Multi-Story

How do one and multi-story schools compare in cost? There is no quick and ready answer. It depends a great deal upon how efficiently the bearing capacity of the earth is taken advantage of. If the complete first floor slab of a one story building rests directly on the ground it furnishes the most efficient medium of support, since it can be built as a road without forms and with only nominal reinforcement. The savings in using such a slab instead of one that has to be formed and supported by structural members is substantial. If foundation walls and, particularly, pipe tunnels or complete pipe spaces are required, this original saving is materially reduced. Another economy that must not be overlooked is that the requirements for fire safety can be less stringent in the one story structure.

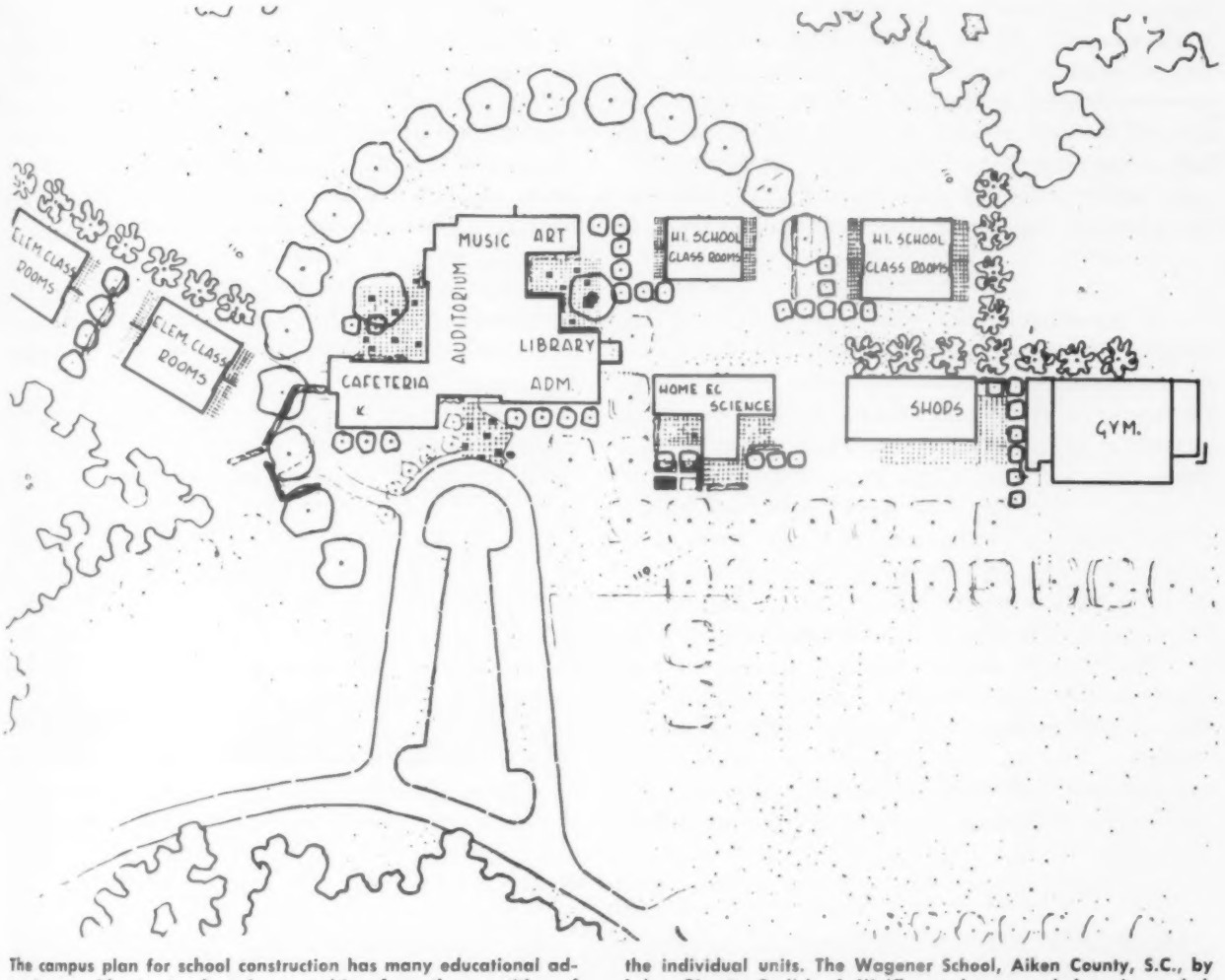
Multi-story schools, on the other hand, offer the economic advantage of reducing roof areas. One roof covers two or more floor levels. The extent of the excavation and foundations is also greatly reduced. The mechanical installation is more compact, and often it becomes easier to install the piping. Heat losses through the roof are reduced because of the reduced roof area. If, for reasons of climate or the installation of mechanical work, the first floor must be a self-supporting structure, then one would expect the multi-story school to be more economical. However, stairs will be required, and the space required for stair towers, including the corridor in front of them, raises the cost quite considerably. Furthermore, the multi-story school in many states is required to be of fireproof construction.

Thus, each problem must be given individual study before an accurate answer can be worked out. In general, educational preferences indicate the one story school, unless this must be so large that the distances from one end to another become too great. Often, the educational preference for a one story school building accords with economy.

In comparing plan types, remember that exterior walls cost much more than interior partitions, and therefore care in reducing perimeter walls results in economies. This is particularly obvious where interior partitions are of cinder block or light aggregate block, but also when plastered partitions are called for.

Analyzing the Campus Plan

The "campus" plan, consisting of a series of small separate buildings, usually of two or three clasrooms each with attendant necessary facilities, tends to be most costly because it has a maximum of exterior wall, with the needed foundations and roof flashings or gutters. If the floor slab is not on earth, the necessary excavations are small and scattered and thus less economical. Heat losses are greater. If each building has its separate domestic type heating equipment, not only is upkeep more costly, but so is provision for fuel. If oil is the fuel, there must be either a number of buried fuel tanks, or an extended system of piping. Gas heat also requires a system of piping. On the other hand, if there is a central heating system, perhaps burning heavier oil and easier to operate, the insulated distribution piping is exceedingly costly. Buried water and plumbing pipes must



The campus plan for school construction has many educational advantages with structural savings resulting from the repetition of the individual units. The Wagener School, Aiken County, S.C., by Lyles, Bissett, Carlisle & Wolff, can be expanded as is needed.

reach, in any case, over the necessarily extended area.

With mechanical work constituting so large a proportion of school building cost, the campus plan may yet be considered worth-while for reasons of education or of appearance, but it is not apt to be economical. Neither, may we say here, does it necessarily permit improved lighting, since light from two sides is condemned by some authorities in favor of diffused unilateral lighting for the pupil, and may prove to be a real handicap to the teacher. Sometimes, where climate is favorable, some saving in corridor space may be claimed, but when climate requires covered or enclosed passages between buildings their cost, too, must be added, however beautiful the result.

Quite different in appearance, but similar in cost considerations, is the plan type sometimes referred to as the "comb" plan. In this plan the classrooms are attached on one face to a common corridor, but with an open space between rooms so that three sides are exposed. Plainly, the corridor length is less than the passageways in "campus" plans, and mechanical lines are not so long, but the corridor is usually planned as a heated space. The extent of exterior wall, the complication of excavation, footings and roof, all operate to make the scheme costly.

In more compact plans, the question arises of whether to place classrooms on one side of the corridor or on both sides. Again, it is the reduced perimeter and reduced corridor length that tend to make the double loaded corridor economical, but, of course, conditions of optimum orientation often justify the somewhat more costly single loaded corridor. The type of daylighting chosen for the individual classrooms, such as high clerestories for elementary rooms, may reduce the cost differential.

More Problems of Perimeter

Reduction of perimeter, of course, should not be carried too far. It should not prevent a separate kindergarten wing, perhaps, where that may provide other advantages. The educator may be faced with a decision of a different kind when the architect attempts to gain compactness by placing the long dimension of rectangular classrooms at right angles to the exterior wall. In many cases this does reduce cost. At the same time it introduces the problem of how to get light into the back

portion of the room. To introduce daylight into this area without harmful glare or bright ceiling spots may absorb much of the savings gained from compactness. As a result, other schemes may depend solely upon artificial light for this area, and educators who feel that artificial light is not yet the equal of daylight may then confine use of that part of the room to "activities," reserving the daylighted portion for the "long continued visual task."

The Factory Plan

At the other extreme, schools can be built on the model of a factory, with either skylights or artificial light for those portions more than twenty-five feet or so from the exterior. If the skylighting meets modern standards of freedom from brightness contrasts, much of the expense may merely have been transferred from the exterior wall to the ceiling and roof. Published cost figures do not indicate much or any saving in the factory plan, as compared with other layouts, but in at least one case, the comparison has been obscured by the use, in the factory plan, of costly metal panel movable partitions. In a school where changes can be made during vacations, the vastly cheaper block partitions would have done as well, and an overall saving might have been shown.

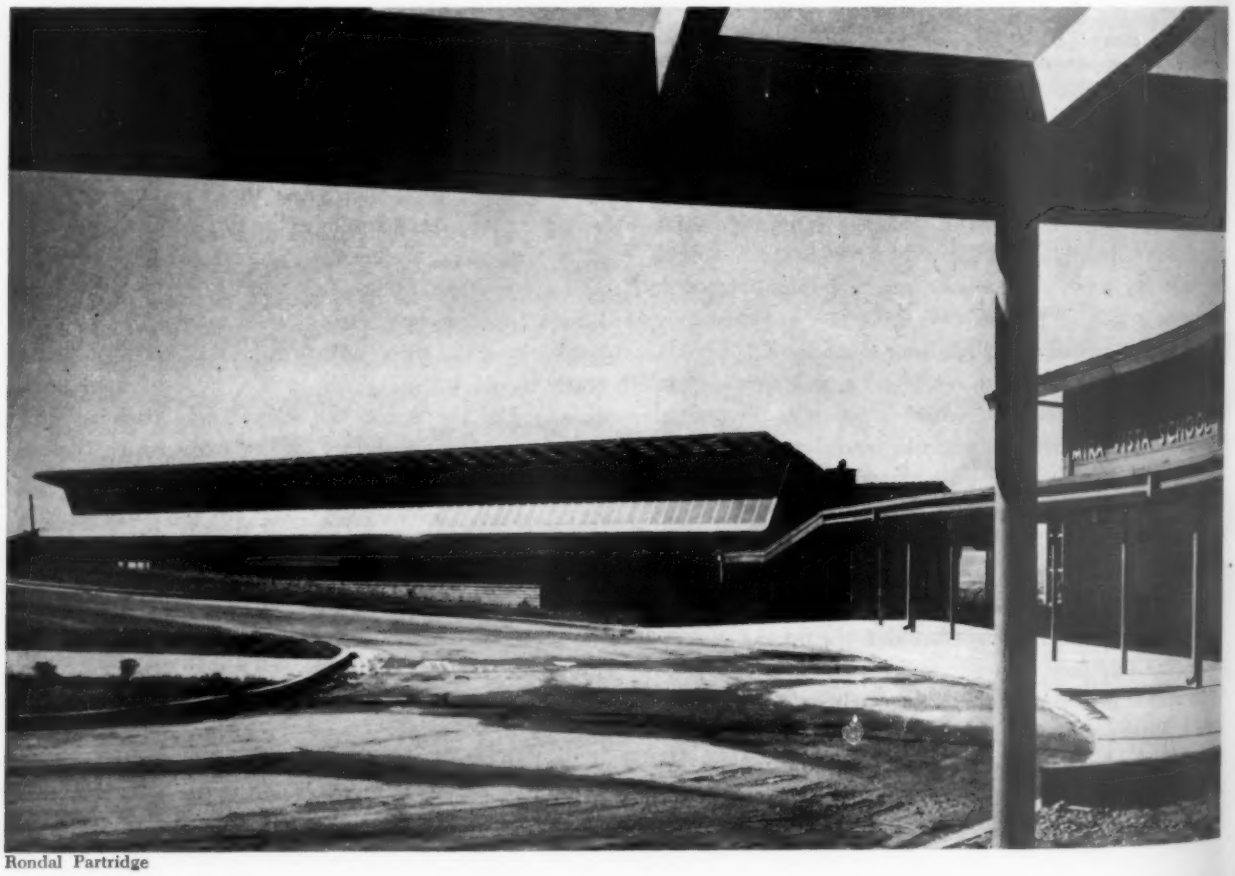
When confronted by such a proposal, the educator has the duty of checking the classroom environment that will result, including the value of a distant view to rest the eyes, and the like. As our knowledge of light diffusion increases, and as better and cheaper means of daylighting and artificially lighted interior areas become available, this type of school plan may show advantages. Meanwhile, it may be considered that shops and other rooms where pupils do not remain long, or stay in one position, may be placed in interior locations.

Suggestions of savings through lowering ceiling height to nine or nine and a half feet offer the psychological advantage of making the classroom more homelike. However, the expedients then necessary for proper distribution of daylight may again use up much of this saving, and there is grave doubt concerning whether or not we know how to light a room of this height artificially in a way that will meet acceptable standards. Here again, it is the duty of the educator to familiarize himself with the requirements of good lighting and to satisfy himself that the design is acceptable. The practice of illumination generally lags somewhat behind theory and research, partly because it is only recently that the latter have evolved from seeming conflicts into a coordinated readily usable whole.

Mechanized Construction

During the year there has been progress in the availability of newer construction techniques. For in-

Architect John Carl Warnecke has accomplished a highly successful utilization of skylights with louvers for the Mira Vista School in El Cerrito, California.



Rondal Partridge

stance, the year has seen a steady increase in "mechanized" types of construction, such as "Youtz-Slick" lift slab and precast walls and slabs. These have been so highly publicized that no reference will be made to individual projects. The lift slab method consists of pouring concrete slabs one on top of the other on the ground, and pulling them up along projecting columns with tension rods activated by hydraulic jacks at the column heads.

The precast wall and slab technique also consists of pouring slabs in layers on the ground, but the walls are tilted and hoisted in place by cranes and the precast



The Big Pine, California, School by Frederic Barienbrock, architect, was erected through mechanized construction techniques. Panels of the building were precast and lifted into place.

slabs are then placed upon the walls, these acting as bearing walls. With the decided trend in this direction, it may be well to offer some general comments concerning the conditions where such mechanized methods are applicable:

1. Unless at least some of the contractors who bid on a project are familiar with the techniques considered, their proposals will not reflect the savings possible. The real advantages of these techniques are not easily ascertained, except by those who have actually built structures of this kind. Many of the advantages lie in doing most of the work near the ground, and also in being able to install mechanical work more efficiently. Obviously, when a job of this type is well organized it will save a great deal of time and thereby overhead and other costs.

The contractor who is not familiar with these methods will not be able to evaluate the factors properly. Indeed, he must allow for the cost of learning the technique and, afraid that something will go wrong, he may add substantial sums for contingencies. Experience has shown that a well designed lifted or precast building offers real economies. Such economies cannot be realized unless the contractors that bid on the job are aware of them and know how to produce them.

2. Another consideration is that the contractor who is well qualified to handle work of this kind may be in a less favorable position, due to distance or other factors, to build the complete project than a local man with less overhead and more familiarity with local labor conditions. A contractor who would be well enough aware of the economies in mechanized techniques may "squander" the economies thus achieved, in other parts of the building operation.

3. Another element that is important is that the building should be located where there are enough contractors familiar with the construction method. In this way competition can be obtained on whatever new type of construction is contemplated.

Shell Types and Hanging Roofs

A great deal of publicity has been given lately to shell type structures and hanging roofs. At present, these types are mostly applicable to large spans, such as auditoriums and gymnasiums. However, the warning should be sounded that for ordinary, medium-sized projects without much repetition, the forming of shells and similar types is so expensive that, at present, these structures must be considered as a luxury. If they are used to enhance the dignity and inspiration of a project, they are a luxury that might well be afforded.

Hanging roofs, on the other hand, are theoretically very economical, since they utilize cables of very high tensile values or sheet metal in tension, and often they can be arranged in such a way that anchorages are obtained through the enclosure elements of a structure, and this at a small cost. We believe that, as our knowledge increases, many interesting and economical structures of a hanging roof type can be anticipated, but at the moment they are of somewhat limited application.

The development of prestressed concrete has been rather slow, and this technique still belongs mostly in the long span class. It is sometimes economical for the larger gymnasiums and auditoriums and has been successfully used in many such cases. It is reasonable to expect that, as the technique develops, it may become

In the Paramount Park Elementary School, King County, Washington, a plastic crimp ceiling is used below overall luminous lighting. Young, Richardson, Carleton & Detlie are the architects.



Chas. R. Pearson

economical even for the shorter spans required for classrooms.

"Sandwich" panels, consisting of some form of weatherproof exterior surface, insulation and an inner finished surface, are now more readily available and more competitive, and problems of condensation within the panel are better understood. Some of the most desirable types, however, are still too expensive for wide use. A similar situation exists with regard to entire window-wall panels, with better hope of price reduction.

Use of Plastics

In the field of plastics, pressure is being brought to bear to use plastics for roof covering. If such covering can be used, it might lead to concrete roof types with plastic sprayed directly on them as weather protection. To our knowledge, no such project of any magnitude has been built, although this method is commonly used for concrete sun shades. One field where plastic sprays for roofs have been very successful is in the repairing of old copper roofs. These roofs can be made watertight much more economically by a complete spray than by trying to doctor up the existing metal roof. Even if the life span of such a spray may be ten years, it is more economical to renew the plastic at that time than if the copper roof were repaired in the first place.



Roger Sturtevant

The aesthetic element is important in school building construction and the school should be an object of pride to the students. This is the Deer Park Elementary School, Fairfax, California, by John Lyon Reid, architect.

The advantages of a one piece flexible covering on a new building are such that one can anticipate the development of plastics with length of service comparable to today's roofings, and a respray would not be costly. Recently a large hospital project utilized plastic finish throughout, at a higher cost, to provide cleanliness and reduced maintenance. It may be some time until a covering of this kind can be afforded in school construction, but it is well to bear it in mind for limited use, both as a finish and as a decoration.

With the press of new materials constantly being developed and promoted, a word of caution is in order. We have lived for years with types of construction that have been commonly used, and have thereby discovered their many pitfalls and defects which develop due to conflicting behavior of different materials. Many cases have come to our attention recently where new materials have not been thoroughly analyzed from this angle, resulting in serious defects.

We mention as one example the common mistake of putting a continuous sunshade outside a highly insulated building. It is obvious that the constant expansion and contraction of the sunshade may have very serious effects on a building structure that is comparatively even in temperature and therefore does not move correspondingly. The remedy is simple enough—to break the continuity by expansion joints—but the consequences of neglecting this precaution are of the utmost seriousness.

There has been progress too, on the part of both designers and the public, in the greater understanding of structure as an aesthetic element, and this must never be lost sight of, for the students' pride in a school building is a worth-while force.

The Architect's Fee

One aspect of cost saving that is rarely mentioned must be touched upon briefly. If an architect's fee is on the usual basis of a percentage of the building cost, the extra work and knowledge that he puts into the attainment of a low overall cost automatically reduces his fee in dollars to the point of no return. Engineers, too, find that when the overall design is one that is really economical, even though the structure is relatively simple, their charge to the architect often must be considerably greater.

Therefore, it becomes increasingly plain that those on a building committee who think it their duty to purchase so variable a thing as design service at the lowest possible price, must be educated to realize that it is the low cost of the building operation, complete with fees, that must be kept in mind. Such economy will be contingent upon the effort expended on the choice of the most conscientious and best informed architectural and engineering service that can be obtained. The professional charges of such a person are less likely to be disproportionate than those of less skilled practitioners, and in no other way can a building be had that is planned for best functioning and for economy and low maintenance cost.

DEVELOPMENTS IN DAYLIGHTING SCHOOLS SINCE WORLD WAR II



by DOMINA EBERLE SPENCER

Associate Professor, University of Connecticut, Storrs, Connecticut

Dr. Spencer has S.B., S.M. and Ph.D. degrees from Massachusetts Institute of Technology. She was an assistant professor at American University, Tufts College and Brown University, before joining the faculty of the University of Connecticut in 1950. Dr. Spencer is the author of over 100 papers and is co-author of *Lighting Design*. She also serves as a consultant in illuminating engineering.

TEN years ago the typical classroom had brown walls, a brown floor, brown desks and black chalkboards. Windows of clear glass were provided with dark green roller shades. Daylight distributions varied across the room by a factor of ten or more; both windows and their reflections were glaring. Artificial lighting was provided by a few diffusing globes. In such a gloomy atmosphere, most lines of sight encountered high contrasts. Light-colored furniture was considered "impractical." In fact, natural finishes were not readily available and could only be secured on special order and at an additional price.

Today we have widespread interest in improved classroom lighting, as shown by educators, architects and illuminating engineers. It is now generally recognized that the basic problem is to design a luminous environment tailored to meet the visual requirements of children. Criteria based on conclusive visual research have been developed and are being applied. New methods of both daylighting and artificial lighting are being perfected to meet the criteria for the optimum luminous environment.

Perhaps the most important part of the change has been the general acceptance of light, cheerful colors for wall, ceiling, floor, furniture and even chalkboards. Indicative of the extent of this change is the fact that natural-finish desks are now the standard of the manufacturers of schoolroom furniture and dark desks can only be purchased on special order and at an additional price.

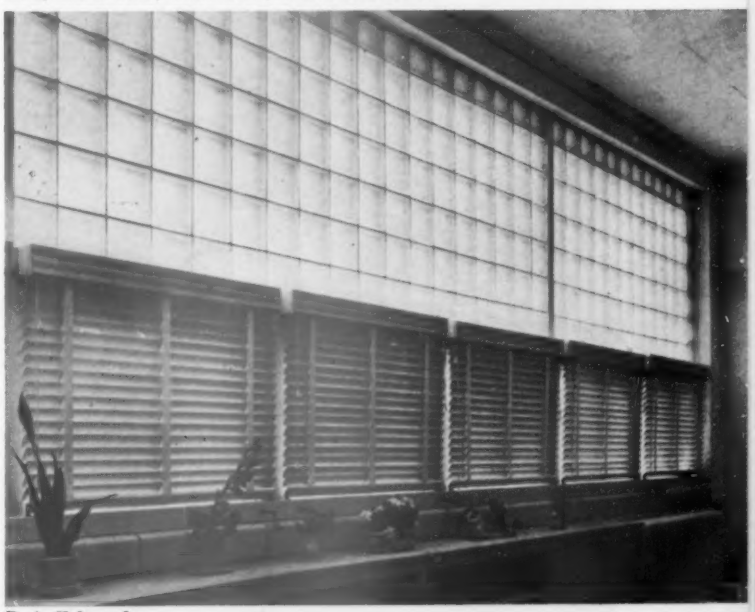
The Luminous Environment

As the criteria for the optimum luminous environment are derived from visual research on human eyes, they are equally applicable to the design of daylighting or artificial lighting. The aim is to produce a helios (generalized brightness) distribution, such that visual conditions are good for all tasks and for all lines of sight. In such an environment, optimum visual performance is possible with freedom from a sense of glare or strain. Head shadows and hand shadows are eliminated; direct and reflected glare are never encountered.

How Much Light?

If the surround is uniform, vision continues to improve as illumination is increased up to daylight levels.

Glass block fenestration in a classroom of the Rosedale School in Austin, Texas, design by D. B. Harmon. Reflectances are: ceiling 0.88; walls 0.75; dado 0.69; chalkboard 0.23.



R. A. Kolvoord

There is no optimum amount of light. *The more light the better—if the helios distribution in the surround is properly designed.* At the present time, average values of 300 to 500 lumen per square meter (approximately 30 to 50 lumen per square foot) are considered minima for classroom tasks. Higher levels are often employed.

To provide comparable visual conditions for all students in the classroom *the incident pharosage (luminous flux density) on the desks should not vary by more than 3:1.* For example, if 600 lumen per square meter are incident on the desk in the most favorable position, at least 200 should fall on the desk in the darkest corner.

Many schoolroom tasks deal with vertical surfaces, as in reading the chalkboard or modeling in art classes, so vertical surfaces should also be well lighted. *The incident pharosage on a vertical surface should be at least one-third of the incident pharosage (luminous flux density) on a horizontal surface placed in the same part of the room.*

Adaptation Helios

The adaptation helios (the generalized brightness of the equivalent uniform field to which the fovea of the eye is adapted) is of great importance in specifying the response of the eye to the luminous environment. The adaptation helios for a uniform field of view is numerically equal to the helios of the background. For a reasonably uniform field, the adaptation helios for any line of sight is simply the average helios of that part of the field subtended by a dime held at arm's length. Adaptation helios for the important lines of sight can easily be calculated or measured.

For optimum visual performance, the adaptation helios should not vary too much as the eyes rove over the entire field of view. The basic criterion is *that the adaptation helios in the normal field of view shall never be more than three times the adaptation helios for the work and always be at least one-third of the adaptation helios for the work.*

In the classroom the 3:1 criterion should be applied to each important task and to all reasonable lines of sight.

Specular Reflections

Many schoolroom surfaces are more or less specular. That is, all ink, most pencil writing and most papers reflect images of bright light sources to some extent. The reflections are in themselves annoying and also serve to reduce the contrast of printing or writing, so that the legible page becomes difficult to read or even entirely illegible.

All sources of light which may produce specular reflections should satisfy the following criterion:

The adaptation helios for any source should not be more than three times the adaptation helios for the work.

Shadows

In the classroom annoying shadows should be eliminated while soft modeling shadows should be retained. Harsh shadows can be eliminated if *the reduction in incident pharosage (illumination) produced by a typical human head or by a standard shadow caster[*] is no more than 10 percent.*

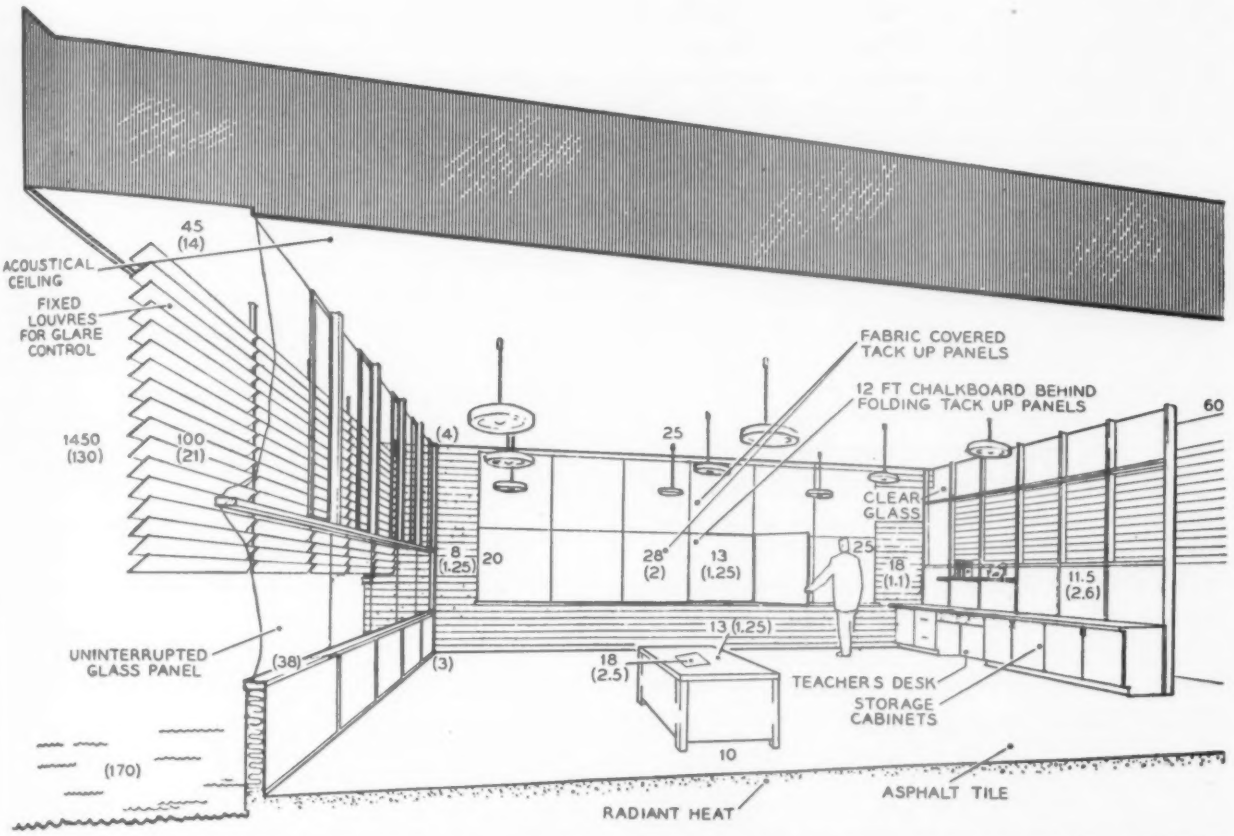
However, for human faces, playing blocks and

[*] A black sphere of diameter 0.15 meters with center 0.375 meters above the work.

Fay Foto Service



Classrooms of the Hyde School, Newton, Massachusetts, have luminous ceilings. The reflectances are: ceiling 0.80; walls 0.63 to 0.76; floor 0.50; chalkboard 0.25; desk tops 0.50.



The design for bilateral lighting with exterior louvers in the Darien Junior High School, Darien, Connecticut, is by Robert MacKinnon, Jr. of Ketcham, Giná and Sharp. Measurements by C. L. Crouch are shown. The figures represent the brightness distribution on a sunny day with direct sunlight on the right hand windows. Values for a dark overcast day are indicated in the parentheses.

other 3-dimensional objects, *the modeling ratio† should be between 2:1 and 6:1.*

Luminous environments satisfying the foregoing criteria are practical and suited to classroom needs.

Methods of Daylighting

The helios of an overcast sky is of the order of 5,000 to 10,000 blondels. If the incident pharosage on the desks is several thousand lumen per square meter (or several hundred lumen per square foot), the sky is not too bright in comparison to the work. The helios of a blue sky varies widely. It may be as low as 5,000 blondels, but a sunlit cloud may reach 100,000 blondels. Outdoors, when we are adapted to daylight, these high values of helios may be entirely comfortable. But if our adaptation helios is lowered, the sky becomes glaring. Various methods of utilizing the light from the sky, while attempting to produce a satisfactory helios distribution, have been devised.

The aim of all recent attempts at improvement in daylighting of classrooms is to obtain:

(a) Greater uniformity in the distribution of pharosage.

(b) Lower helios ratios.

† Ratio of maximum to minimum readings on a pharosage (illumination) meter as it is held at a point and rotated into all possible directions.

Clear Glass

For centuries clear glass has been used in windows. It has the tremendous advantage of permitting the occupants of the classroom to see outdoors. It is generally agreed today that, even where some elaborate window treatment is used over most of the fenestration, a vision strip of clear glass should be provided. A second advantage is that such windows can be opened for ventilation.

Close to a window the incident pharosage is approximately one-fourth to one-eighth of the helios of the sky. Thus, even under optimum conditions the 3:1 adaptation helios criterion is slightly exceeded. As we move toward the back of the room, the incident pharosage falls off by a factor of 10:1 or even 100:1, and the helios ratios between work and window increase correspondingly. Even if the room is only about as deep as the window is high, the helios ratios at the back of the room may be nearly 100:1. Even when the sun is not shining on clear windows, many lines of sight are uncomfortable sources of direct and reflected glare.

Venetian Blinds

Venetian blinds can be hung inside clear glass windows to control the helios of the window. On cloudy days, with slats in horizontal position, Venetian

blinds reduce the average helios of the window as viewed from some angles and also reduce the incident pharosage. On sunny days, if the slats are tilted upward, the helios of the window is reduced while uniformity of the pharosage distribution is improved.

The flexibility of the control provided with Venetian blinds is an advantage if someone can give the windows the necessary attention. In the classroom, however, the attention of teacher and students is supposed to be concentrated elsewhere. Many educators feel that human control of the luminous environment should not be required, and consequently prefer not to use Venetian blinds.

Fixed Louvers

Some of the advantages of Venetian blinds, without the necessity for adjustment, can be obtained with fixed louvers placed inside or outside of the windows. Vision of the outdoor world is still possible, but helios ratios in many directions are reduced.

A Connecticut classroom, using horizontal, exterior bilateral louvers has been measured. Here the incident pharosage varies from 925 lumen per square meter to 430 lumen per square meter (a ratio of only 2.2:1) with the sun on the corridor fenestration. But on a dark overcast day, the pharosage is only 70 lumen per square meter to 16 lumen per square meter (a ratio of 4.3:1). A surprisingly uniform distribution of light is obtained, but on overcast days the daylighting is entirely inadequate. Most of the helios ratios in this classroom satisfy the 3:1 criterion. But the fenestration itself is still not entirely inoffensive. The helios of the clear sky is visible through the slats from many angles. Adaptation helios ratios as high as 75:1 may be obtained if one looks between the slats or 5:1 if the louvers shield the sky for the line of sight in question. On a cloudy day the adaptation helios ratios from work to windows may be between 20 and 100. Even with bilateral-louvered fenestration, the criteria for an optimum luminous environment are not satisfied for all lines of sight.

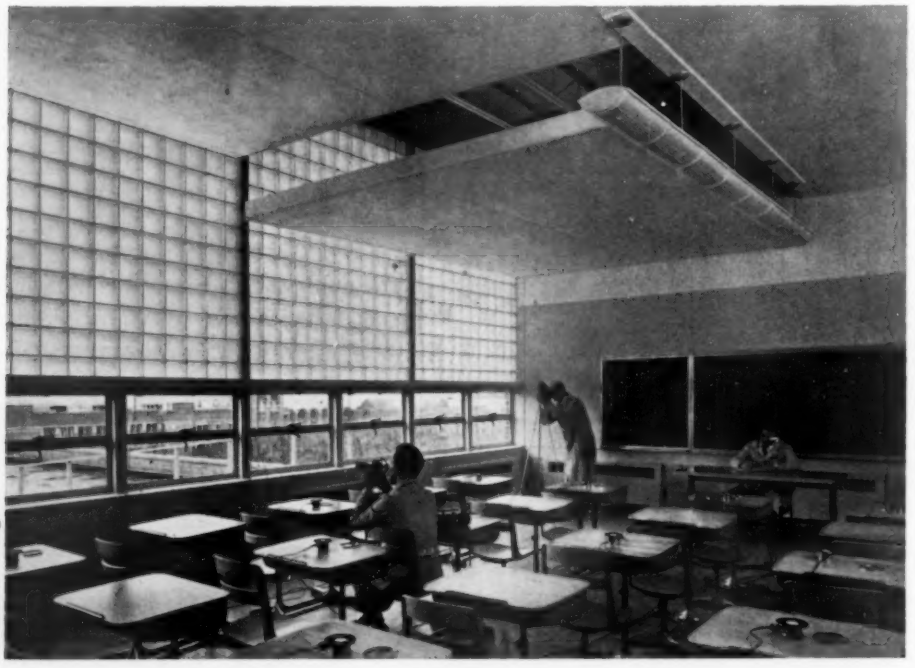
Translucent Screens

Fiberglas diffusing screens have been used to reduce the helios of the upper part of the window. For an average location, the screens reduce the adaptation helios ratios to 5:1. For the unshaded portion, ratios up to 50:1 are obtained in the center of the room. Roller shades or Venetian blinds are used over the lower portion of the windows. Though the result is not particularly aesthetic, a cheap method of control is obtained.

Glass Block in Walls

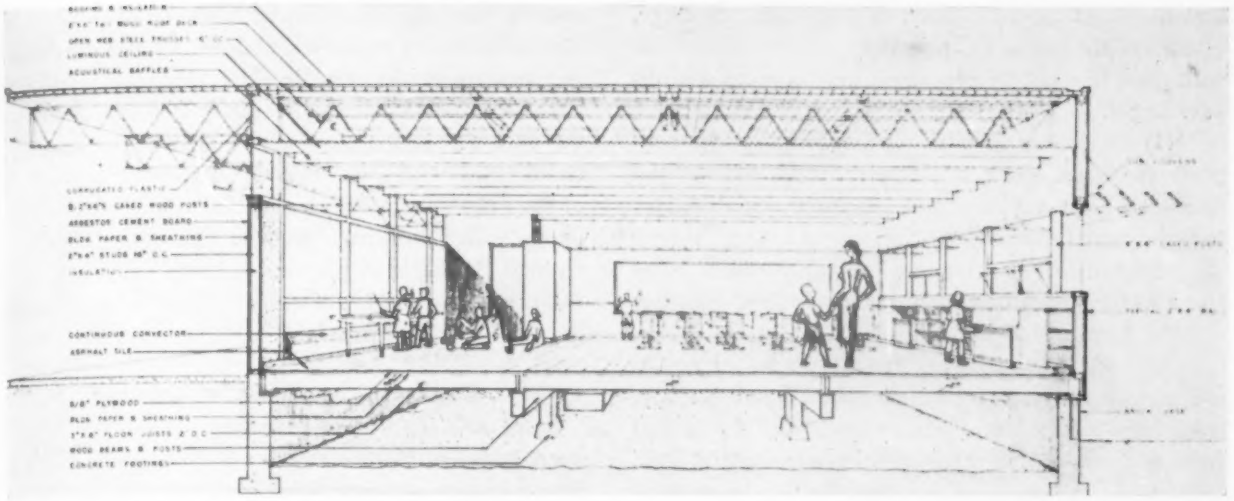
Glass block is widely used in modern school construction. The aim is to provide adequate shielding from sun and sky and to improve uniformity in illumination distribution. Typical construction employs a shallow vision strip, above which diffusing glass blocks are used. For sunlight exposures, the upper part of the window is constructed from prismatic glass block which is designed to direct as much light as possible toward the ceiling and to have a comparatively low helios when viewed from below. As glass block is far from uniform in helios and contains sparkling highlights when sunlight falls on it, measurements of the actual helios distribution are difficult to make. For northern exposures, diffusing glass blocks are ordinarily used for the entire window.

More recent data on glass block are given by Dr. R. A. Boyd, research physicist at the University of



Hedrich-Blessing

Experimental classroom at the University of Michigan. Dr. R. A. Boyd obtains unusually good results with glass block by using exceptionally high reflectances: ceiling 0.88; walls 0.63 to 0.77; chalkboard 0.21; tackboard 0.21; floor 0.32; desks 0.48.



Classroom section of the Paramount Park School in King County, Washington, designed by Young, Richardson, Carleton and Detlie. Acoustical baffles are located below the luminous ceiling.

Michigan. Prismatic glass block is used above a clear vision strip. On a clear day, incident pharosage on desks varies from 1,230 to 2,960 lumen per square meter, and on an overcast day from 300 to 810 lumen per square meter. Highest adaptation helios ratios are about 10:1 and these occur only when the glass block panel is compared with the task. As the glass block is located on a vertical wall, there are many orientations in which reflected glare can be avoided and optimum visual conditions attained. Nevertheless, at the high levels of over 1,000 lumen per square meter which are available on sunlit days, adaptation helios ratios of 10:1 are by no means satisfactory. Even with high reflectances and careful design of the fenestration it is apparently impossible to satisfy the 3:1 adaptation helios criterion for all lines of sight with walls of glass block.

Dr. Boyd has obtained unusually good results with this type of fenestration because he has used exceptionally high reflectances. Nevertheless, the simple geometric fact that the window area of a classroom is, of necessity, small in comparison with the floor area, keeps us from attaining optimum visual conditions with glass block windows.

Glass Block in the Ceiling

In the last year engineers interested in daylighting have focused their attention on introducing daylight through the ceiling rather than through the walls. Two methods of toplighting with glass block have been proposed. One system uses 12-inch glass block with a minimum width of concrete joint of 2¼ in. The block has etched interior surfaces, a fibrous glass screen between the halves, and a cylindrical lens surface on the interior face. The "average transmittance" of the block is 0.24.

Another form of glass block is available in prefabricated panels 3 by 3 feet, 3 by 6 and 4 by 4 feet. These panels consist of hollow hermetically sealed glass units 10⅜ inches square, set in an aluminum grid on 12-inch centers. Transmittance is 14 to 20 percent for winter sunlight and 8 to 18 percent for summer sun altitudes, while values up to 26 percent are obtained for north skylight. This variation is intended to produce an essentially constant amount of incident pharosage at noon throughout the year.

Glass block toplights or skylights can be combined with glass block walls. However, the helios of the glass block itself will be of the order of 1,000 to 20,000 blondels and will vary from hour to hour in a manner which cannot be controlled. If the incident pharosage on the desk is up to about 700 lumen per square meter (or approximately 70 lumen per square foot) on a dark overcast day and 14,000 lumen per square meter (or about 1,400 lumen per square foot) on a sunny day, the 3:1 adaptation helios criterion might generally be satis-

Fiberglas diffusing screens at 45-degree angles cover the upper portion of clear glass windows at the Rosedale School in Austin, Texas. The design is by D. B. Harmon.



R. A. Kolvoord

fied. But to attain such high levels of incident pharosage, essentially the entire ceiling would have to be covered with glass block. This procedure has three serious disadvantages:

(1) The concrete or metal framework which supports the glass block will appear black against the bright glass. At high levels of adaptation such contrast is highly unsatisfactory.

(2) If the ceiling becomes a skylight there is no space left for installing high quality artificial lighting.

(3) The cost is prohibitive.

Methods of installation actually proposed are to use narrow panels or strips of glass block in the ceiling, sometimes installed at a higher level than the ceiling itself so that it will be shielded from some angles. Such lighting may be designed to satisfy the requirements of the foot-candle meter but cannot be designed to eliminate direct and reflected glare for all locations in which pupils can be expected to be working.

Plastic Domes in the Ceiling

An alternative method of introducing daylight into classrooms through the roof employs plastic domes mounted in metal frames. Such units are available in square, rectangular and circular shapes. Circular units with diameters up to 5 feet are now on the market, as well as rectangular ones up to 5 by 8 feet. Domes are made of clear or translucent plexiglass between three-sixteenths and five-sixteenths inch thick. The transmittance of the translucent bubbles is about 0.50.

The chief difference between glass block skylights and plexiglass bubbles is that the latter have higher transmittance and consequently greater helios. A suitable luminous environment can only be obtained if the entire ceiling is covered with the diffusing bubbles. But this is not the way they are being installed. The suggested practice is to use three or four bubbles at the dark side of the classroom. The resulting luminous environment is highly unsatisfactory, because the area of the light source is too small. Any method of skylight design which introduces spots of light into the ceiling, restricts the range of pleasant fields of view and introduces multiple sources of reflected glare which can seldom be dodged successfully.

Daylight Plus Artificial Lighting

As none of the methods of daylighting which have been proposed to date satisfies all of the requirements for an optimum luminous environment, and as none of the methods of daylighting provides an adequate quantity of light on dark overcast days, *it is necessary to combine the design of the daylighting of classrooms with the design of the artificial lighting system.*

Opinion on the relative importance of the two systems covers a considerable range. Some experts consider that a good daylighting system is so far superior to most artificial lighting that daylight should be utilized for as long hours as possible, while a "cheap" system of artificial lighting should be installed for emergency use.

Several facts are ignored by those who wish to concentrate solely on daylighting. They neglect the fact that superior luminous environments are economically available today, which provide a better visual condition than those available in the daylighted classrooms. By deciding to make the minimum initial investment in

Sylvania



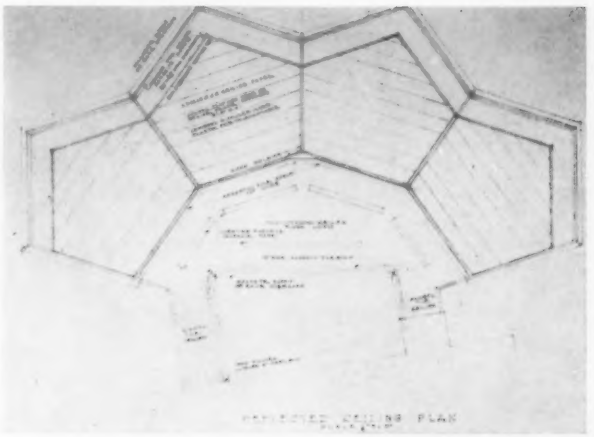
Fenestration treatment in the Bowditch School, Salem, Massachusetts, includes an adjustable black shade, an adjustable translucent shade and a set of vertical steel louvers 4 inches wide and 3½ inches apart. High room reflectances contribute to the improved daylighting. Design is by Willard Allphin.

luminaries, the architect often ends up with ring-type incandescent fixtures (low initial cost but very high operating cost). He estimates that the lamps will burn only an hour or so a day and thinks the large cost of the electricity used per hour does not matter. Actually, it is customary to burn the incandescent lamps all day. The power bill is several times what was predicted. A better luminous environment at lower cost could have been obtained by use of fluorescent lamps.

A second approach is to recognize that daylight is inadequate but useful and to design an artificial lighting system which, in conjunction with some supplementary lighting, gives the optimum luminous environment throughout the day.

The third approach is to recognize that daylighting is neither free nor dependable. Glass block, plexiglass bubbles and elaborate systems of louvers are expensive additions to the cost of the building. It may be more realistic and economical to design the best possible artificial lighting system and to depend on windows for nothing more than an attractive psychological effect.

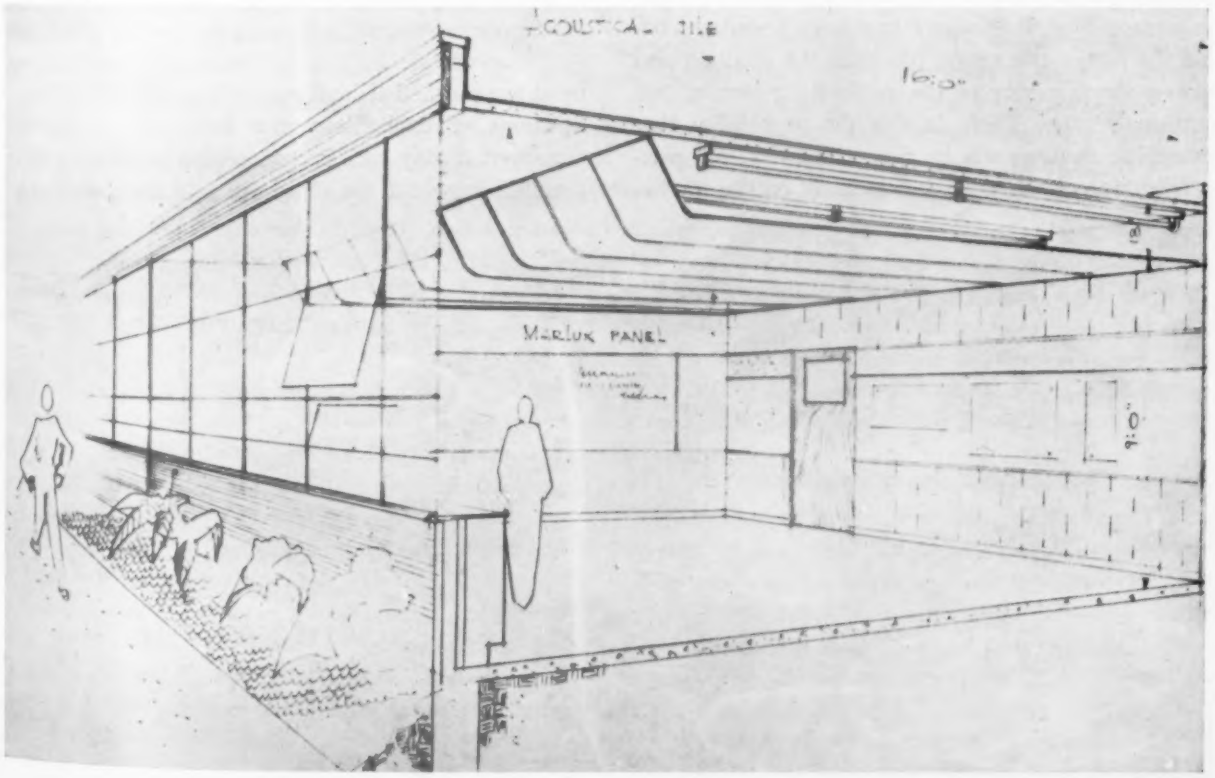
Several methods of combining artificial lighting and daylighting are now under construction. Architect Yamasaki, in the Grosse Point, Michigan, Country Day School, has combined a luminous ceiling and a skylight in a manner which is expected to produce an excellent helios distribution at all times. Light from the sky enters through an absorbing glass which removes most of the ultraviolet and also eliminates much of the heat from direct sunlight. Fluorescent lamps without reflectors are placed below the glass and about two feet above a diffusing sheet of corrugated plastic. Whether light from the sky or from the fluorescent lamps is employed, the classroom is lighted by a luminous ceiling.

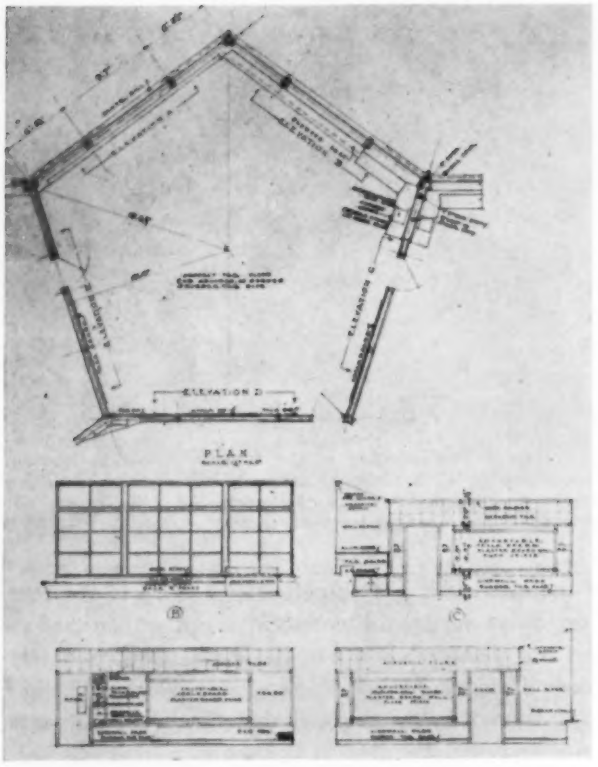


Classrooms in the addition to the Franklin School in Newton, Massachusetts, A. B. Sziklas, architect, have luminous ceiling panels. Despite the shape of the rooms, the interiors are not dependent upon daylight for illumination.

This design has the disadvantage that the artificial lighting system is very inefficient unless opaque, white blinds are employed behind the lamps, and such movable controls would doubtless encounter mechanical

Superior luminous environments are economically available today and, when combined with daylight, an optimum luminous environment is possible throughout the day.





There are windows on two sides of the classrooms in the Franklin School addition. The luminous diffuser of the luminous ceilings consists of corrugated plastic with a 50 percent transmittance. A. B. Sziklas is the architect of the building.

difficulties. Three times as many fluorescent lamps are needed here as would be required for a standard luminous ceiling. Reflectors might have been used behind the lamps, but would block off the daylight and increase the efficiency of the artificial lighting system surprisingly little. There is also the probability that perceptible shadows will be cast on the diffusing plastic whenever direct sunlight is incident on the roof.

Conclusions

From the foregoing study of recent advances in daylighting a number of conclusions may be drawn:

1. None of the methods of daylighting which have been proposed so far satisfies the criteria for an optimum luminous environment for all lines of sight.

(a) It is possible today to obtain a sufficiently uniform distribution of incident pharosage (less than 3:1 variation from window wall to darkest part of the room).

(b) It has not so far been demonstrated possible to satisfy the 3:1 adaptation helios criterion for all lines of sight in a daylighted classroom.

2. The helios ratios in the best daylighted classrooms are lower than are found in many artificially lighted classrooms being installed today. They are interior to the luminous environments which are being obtained with the best available systems of artificial lighting.

3. With single-wall fenestration, the objectionably high helios ratios are associated with the window itself. If these are on one vertical wall, it is possible to avoid the direct glare and specular reflections by suitable orientation of desks (if pupils are assumed to stay in a fixed position!)

4. If bilateral or toplighting is used and the 3:1 helios ratio is exceeded, direct and reflected glare will be present for many lines of sight.

5. If classroom lighting is to be designed so that a pupil is free to move from one position to another without encountering restrictions imposed by his luminous environment, we cannot depend on daylight alone.

The criteria for the optimum luminous environment are satisfied if luminous ceilings or suitable combinations of daylighting and luminous ceilings are employed. Today such designs appear to offer the most practical answer to the visual needs of the classroom.



PLASTIC SKYDOMES PAY DAYLIGHTING DIVIDENDS



by BERNARD F. GREENE

Consulting Engineer, New York City

Mr. Greene is a graduate of Massachusetts Institute of Technology and specializes in electrical and illuminating engineering. He is a member of the staff of the M.I.T. Bemis Foundation. Mr. Greene is a consultant for the Illuminating Engineering Society Daylighting Committee. He has acted as electrical and mechanical consultant for schools, hospitals, etc. His many articles on lighting have been published in various journals.

OPENING the classroom roof to the sky permits unlimited possibilities for effective and economical daylighting designs. Once designed, a well daylighted classroom provides dividends in good lighting and savings in electrical costs throughout the life of the building.

An effective and practical way to obtain good daylighting is by toplighting with plastic skydomes. With this daylight fixture uniform glare-free illumination can be provided throughout the interior space. The amount and distribution of daylight can be controlled by varying the size and quantity of the roof fixtures.

These fixtures consist of plastic dome skylights surrounded by metal frames. The domes are factory-assembled, packaged units, available in a large variety of square, rectangular and circular sizes. Circular units are available three, four and five feet in diameter; square units in sizes of two, three and four feet; and rectangular units in sizes ranging from two by two-and-one-half feet to five by eight feet.

The domes are vacuum drawn from a single piece of thermoplastic acrylic plastic. This material is used because of its high light transmission, good light diffusion properties, resistance to breakage and shattering, light weight and its ability to withstand outdoor weathering. Domes are available in either clear or white translucent plastic. However, for almost all daylighting applications translucent plastic is used.

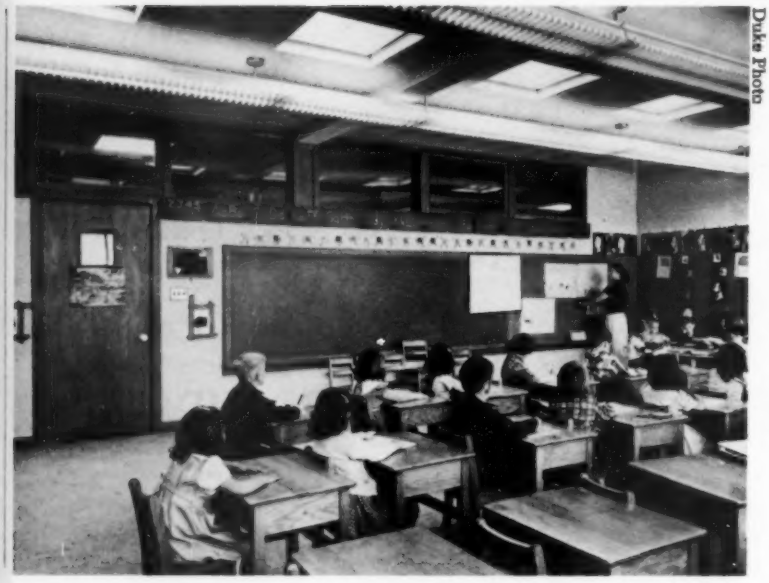
The thickness of the plastic dome varies between three-sixteenths and five-sixteenths of an inch, depending upon its size. The diffuse transmission of acrylic plastic is three-sixteenths of an inch—55 percent—and one-fourth of an inch—48 percent. The dome, or bubble shape, has proven to be desirable because of its high strength, pleasing appearance and ease of maintenance.

Experiments have shown that better maintenance is possible when surfaces are angled away from the horizontal. The formed shape allows self-cleaning when it rains and also serves to reduce the possibility of snow and ice accumulations. In clean areas the assumed maintenance factor for skydomes is 70 percent.

Daylighting and Brightness

All things being equal there is no limit to the amount of light which can be used. It makes little difference whether this light has a spectral distribution similar to the sun, sky, a fluorescent lamp or a candle. For equal brightness a given illumination level in foot-candles provides the same visual effectiveness regardless of the type of source used.

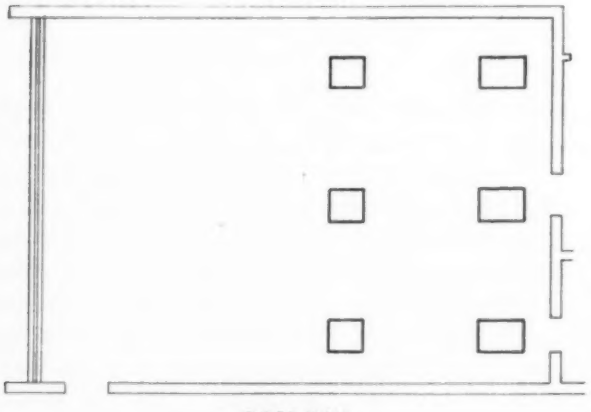
A limit to the amount of light provided in a classroom is usually determined by the costs involved. In



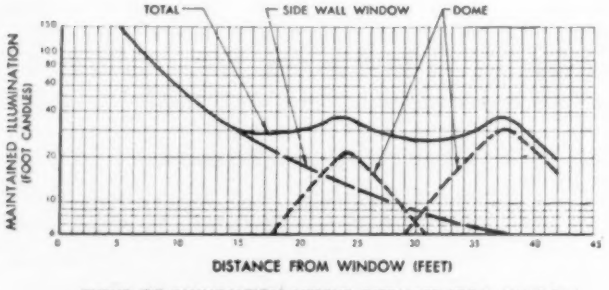
Duke Photo

Skydomes are used in classrooms of the Clyde Erwin Elementary School, Jacksonville, North Carolina, Leslie Boney, architect. Brightness of the skydomes is controlled by drawstring shades.

1906, when the cost of light was high, the Illuminating Engineering Society recommended a level of one foot-candle for artificial lighting. Now, with decreased lighting costs the level of light is set at 30 foot-candles. In the future it can be expected that recommended lighting levels will be set still higher.

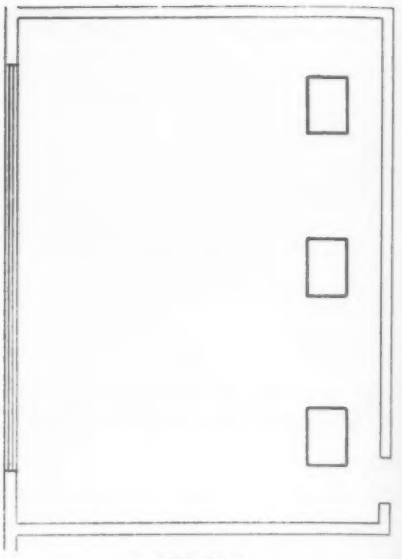


FLOOR PLAN

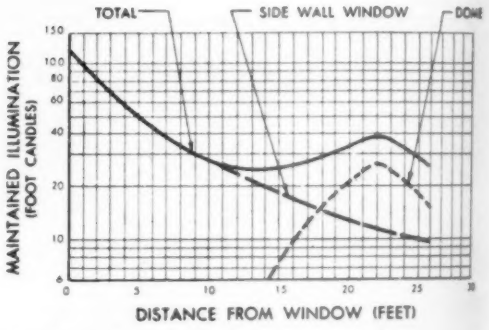


CURVE OF ILLUMINATION VERSUS DISTANCE FROM WINDOW

This classroom has a seven-foot high window on one wall. The depth of the room requires the use of two rows of translucent domes. One row is of three-foot-square units, the other of 3 by 4-foot units. Light distribution for the room is shown on the graph, curve of illumination versus distance from the window.



FLOOR PLAN



This classroom has a six-foot sidewall window and five-foot overhang. Three 3 by 4-foot translucent skydomes are used as sources of daylight. The graph shows the curve of illumination.

The current design levels set for daylighting are similar to those being used in artificial lighting. However, the illumination levels are based upon a minimum sky brightness.

In daylighting, the light source is the sun and sky. The actual sky brightness in any location varies with weather conditions, with the time of day and the time of year, and it is necessary to assume a certain minimum value of sky brightness. The value chosen for almost all calculations is the sky brightness on an overcast day, resulting in a horizontal illumination of 1,000 lumens per square foot. For a uniform sky brightness this is equivalent to a vertical illumination of 500 lumens per square foot. In an area of about 42 degrees latitude this value of sky brightness is, in general, available at least 85 percent of the daylight working hours throughout the year. Using this value, the illumination and brightness at any point in a room can be calculated from any daylight source.

The light distribution from a single translucent

dome is assumed to be similar to that from a surface source. This applies whether the primary source of light is an overcast sky or a clear sky with direct sunlight, diffused by white plastic. By using curves calculated for obtaining illumination from a surface source, the light distribution curve can be obtained.

Where a number of domes are used, the illumination can be obtained either by a point by point calculation, using calculated distribution curves of single units, or by use of the interreflection method of illumination calculation. When domes are the sole source of illumination, the interreflection method is the most convenient to use, as it allows for different room reflectances.

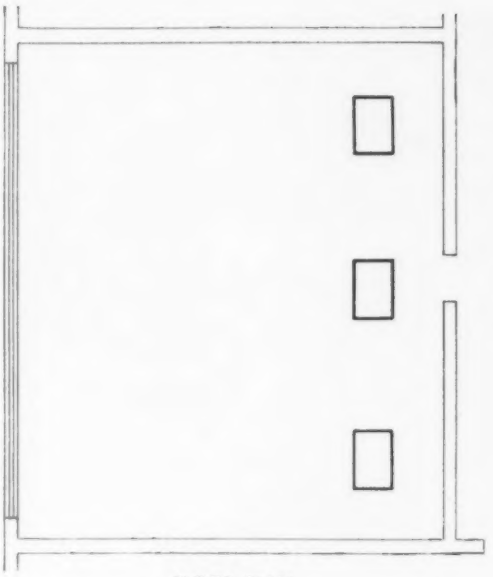
Skydome Application

Skydomes have been found to be effective for complete daylighting of an interior and as an adjunct to sidewall windows. With unilateral sidewall fenestration the illumination is at a maximum near the window and decreases as the distance from the window increases. With a daylighting fixture, such as the dome, the daylight can be placed where needed, resulting in uniform light distribution.

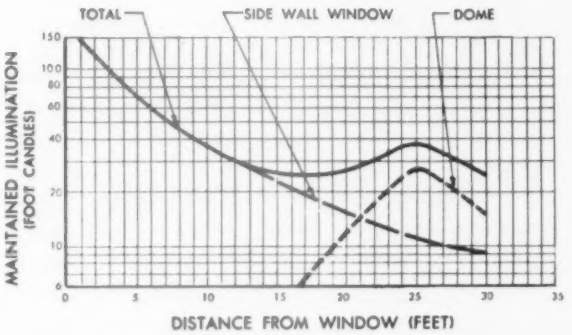
For rooms without sidewall windows the domes can be placed uniformly throughout the area, similar to the design of an artificial lighting system. In general, the spacing between domes should not exceed one and one-half times the ceiling height, while the spacing between the first row of units and the wall should be one-half of this value. For large size dome units the spacing can be up to twice the ceiling height. If the task to be illuminated is high off the floor, the spacing between the units should be reduced.

Skydomes illuminate the corridors of the John B. Turney Elementary School, West Chicago, Illinois. Architects of the building are Frazier and Raferty.





FLOOR PLAN



CURVE OF ILLUMINATION VERSUS DISTANCE FROM WINDOW

This classroom has sidewall windows seven feet high with a four-foot overhang. Three 3 by 4-foot translucent domes are used for the illumination distribution shown in the graph.

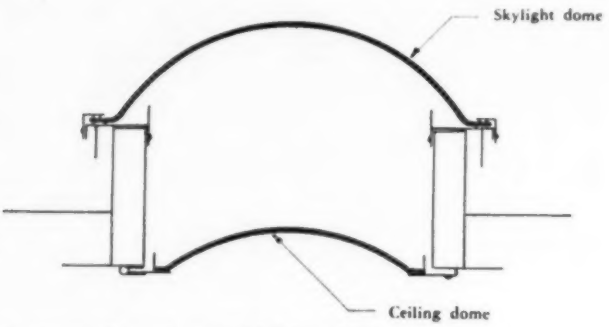
Each installation has to be considered separately. The domes must be arranged to give uniform lighting of the required intensity. For an economical design a small number of units should be used, since the larger units are more efficient.

Skydomes fill in with daylight where sidewall illumination drops off. When a room is not deep, in comparison with window height, one row of domes is all that is required. For deep rooms, in comparison with window height, two or more rows of domes should be used. The required number of domes varies with the room length, since the width of the sidewall window determines the amount of light penetration into the room. The illumination distribution curves given in the accompanying graphs indicate the average distribution across a room width.

There can be a special application of daylighting in an area without sidewall windows, such as a corridor. Since this is not usually a work area, complete uniformity of illumination is not essential and skydome installations have been made with spacings up to three

times the ceiling height. There have been many examples of installations in windowless areas such as gymnasiums and playrooms.

Ceiling domes are sometimes used with skylight domes. The ceiling dome is a translucent plastic bubble mounted in a frame. It is installed at the bottom of the skydome well, flush with the ceiling. Ceiling domes are

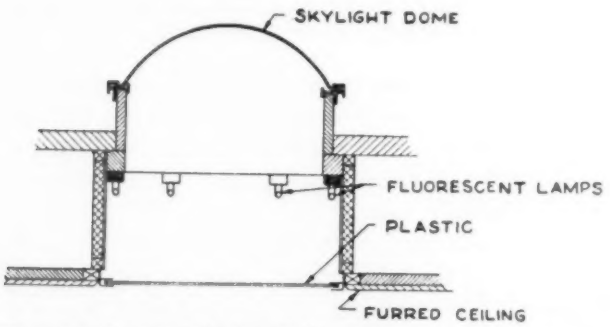


A cross-section of a combination dome and ceiling bubble arrangement. The purpose of the plastic ceiling dome is to reduce the brightness further.

used to reduce the brightness further, to give additional insulation in extremely hot or cold areas and for concealment of artificial lighting fixtures.

Natural and Artificial Lighting

Daylighting and artificial lighting are often combined to provide well planned lighting day and night. Three schools, designed for Portchester, New York, are examples of this integration of artificial and natural light. Here the domes and fluorescent strips are placed

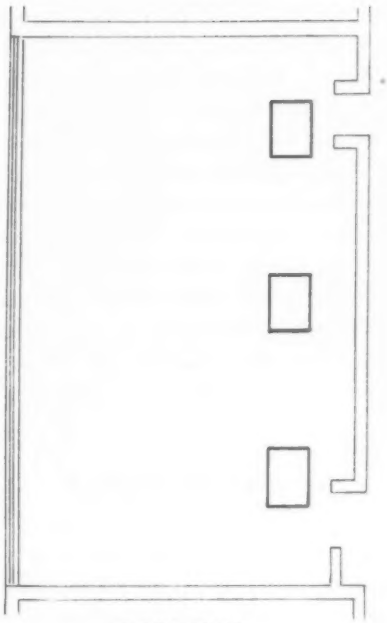


Fluorescent lamps can be installed in conjunction with a skydome arrangement. The lamps are concealed by placing them above plastic panels in the ceiling.

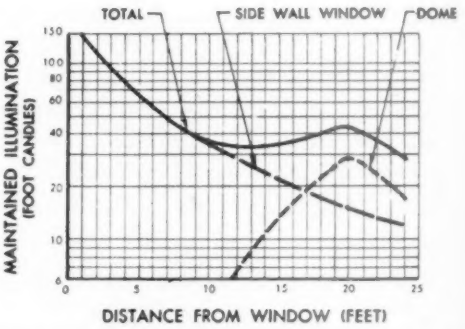
above translucent plastic panels. The plastic panels are mounted on the roof joists. Architects for the schools are Sherwood, Mills and Smith; mechanical engineer, B. F. Greene.

Natural Light and Ventilation

Wherever skydomes are used for daylighting it is possible to obtain natural or mechanical ventilation by building the ventilating unit into the roof curb. There



FLOOR PLAN



CURVE OF ILLUMINATION VERSUS DISTANCE FROM WINDOW

This rectangular-shaped classroom has seven feet high sidewall windows. There is a four-foot overhang. For supplementary lighting three 3 by 4-foot skydomes are used. The illumination distribution, by use of the skydomes, is shown in the graph.

is available a prefabricated unit which incorporates a ventilating fan built into the skydome curb. A number of ventilating fans can be built into a single skydome curb.

The Costs Involved

Engineering for daylight is more than compensated for by the availability of good light throughout the day. The added costs for installing daylight fixtures can be offset by the resulting saving in electrical energy costs. It will be noted that only energy costs are considered, since it would be necessary to install a complete artificial lighting system to take care of dark days and nighttime usages.

The use of skydomes or related accessories opens a wide field of design for school architecture. With these new tools for daylighting it is possible to obtain more economical as well as more workable schoolroom arrangements.



One of the buildings at Rutgers University now heated by a hot water system is Demarest Hall. This dormitory was designed by York and Sawyer, architects.

HEATING WITH HIGH TEMPERATURE WATER SYSTEMS AT RUTGERS UNIVERSITY



by FRED L. MOESEL

Mongitore & Moesel, Consulting Engineers, New York, New York

Mr. Moesel has had 36 years of experience as a consulting engineer. Among the projects on which he has served as consultant are the new Tripler General Hospital in Hawaii, Walter Reed Hospital, many buildings at West Point and St. Albans Naval Hospital and many large projects for the U.S. Army, Navy and Atomic Energy Commission.

OUTSIDE underground heat energy distribution systems for universities entered a new era in 1953 with the completion of a high temperature water transmission system for the University Heights Campus at Rutgers University, New Brunswick, New Jersey. The new system at New Jersey's State University replaces the conventional steam system which had been in use, and requires a design water temperature of 400 degrees Fahrenheit, with 235 lbs. of boiler pressure to maintain it.

All steam, water and compressed air services are provided for two newly completed buildings on the campus from a single conduit which contains the water lines and a 100-lb. compressed air line. This conduit passes within easy reach of future buildings arranged on a wide arc, with provision for further extension beyond the most recently constructed Microbiology building. The present mains extend a distance of 2,400 feet from the boiler house, while the future extension will ultimately reach 5,800 feet.

High temperature water, as the most economical heat energy carrier, was selected in late 1948 for the Heights Campus, but certain construction programs delayed the actual boiler house completion until November, 1953. Approximately 700 feet of the permanent conduit with two 12-inch lines were installed in the fall of 1949, and used until November, 1953, for steam and pumped returns to and from a temporary steam plant. After the 12-inch lines were installed the extent of future construction planning was increased greatly. It was then considered economical to increase the extension of the lines to 14-inch diameter to keep friction losses at a reasonable initial total, and to maintain a lower water pumping cost. The 12-inch lines

could have been continued, but little reserve would have been available for any future unforeseen increase in load or distance.

Starting and operating our high temperature plant provided some problems caused, for the most part, because our boilers, which are 750-H.P. units, were only 60 percent loaded under maximum conditions. Two additional buildings were expected almost immediately, but they have not yet materialized.

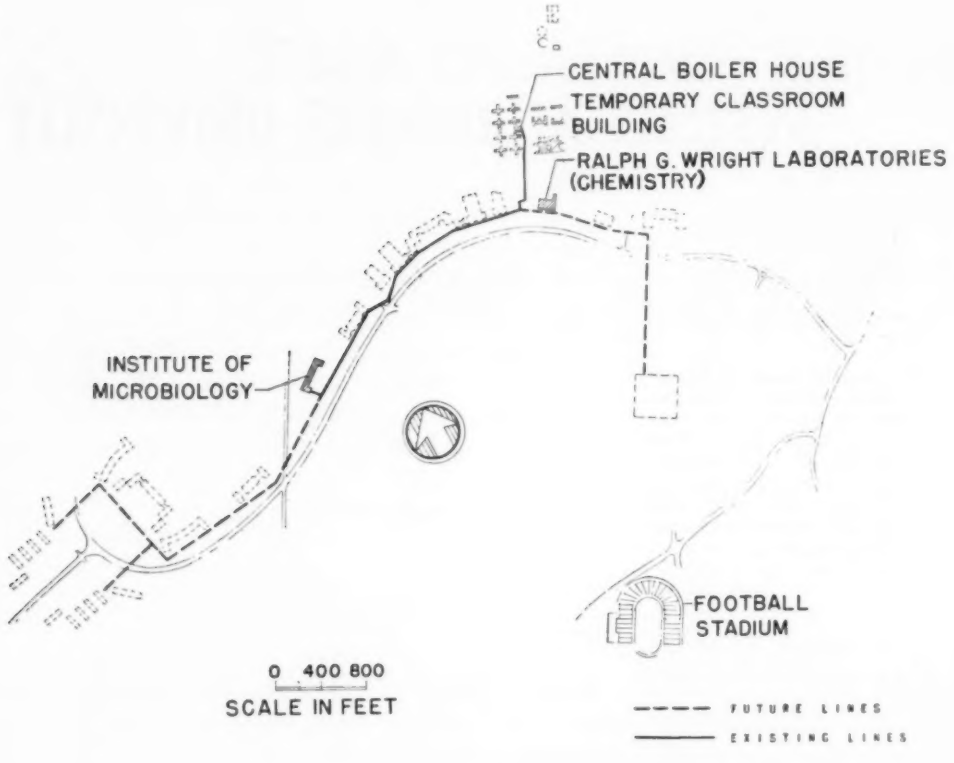
Operating the Plant

By a trial and error method the operating crew, which is on duty 24 hours a day, provided a method of operation which is proving quite satisfactory. Many additional features could have been included in our plant, but funds were limited. It is essential, with high temperature hot water systems, that the highest quality of boilers, pumps, pump packing and valves be secured through rigid specifications and guarantees.

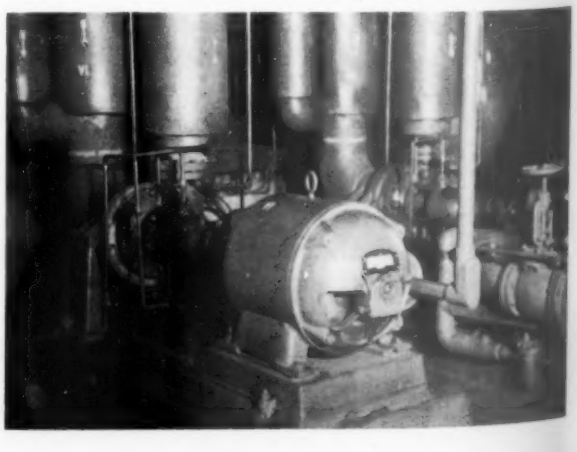
The boilers in this project are of the forced circulation type, but other boilers are also being used. In 1948 it was practically impossible to interest boiler manufacturers in high temperature water projects. Manufacturers now realize that high temperature water systems will be used almost exclusively for distribution systems, and they are adapting themselves to the situation.

The underground conduit used consists of poured insulating concrete wrapped in waterproofing. At points where the piping enters or leaves manholes, stuffing boxes are provided. This type of conduit was selected for its insulating properties, because the pipe was continuously supported on a masonry base without corrodible iron supports and because it was reasonable in price.

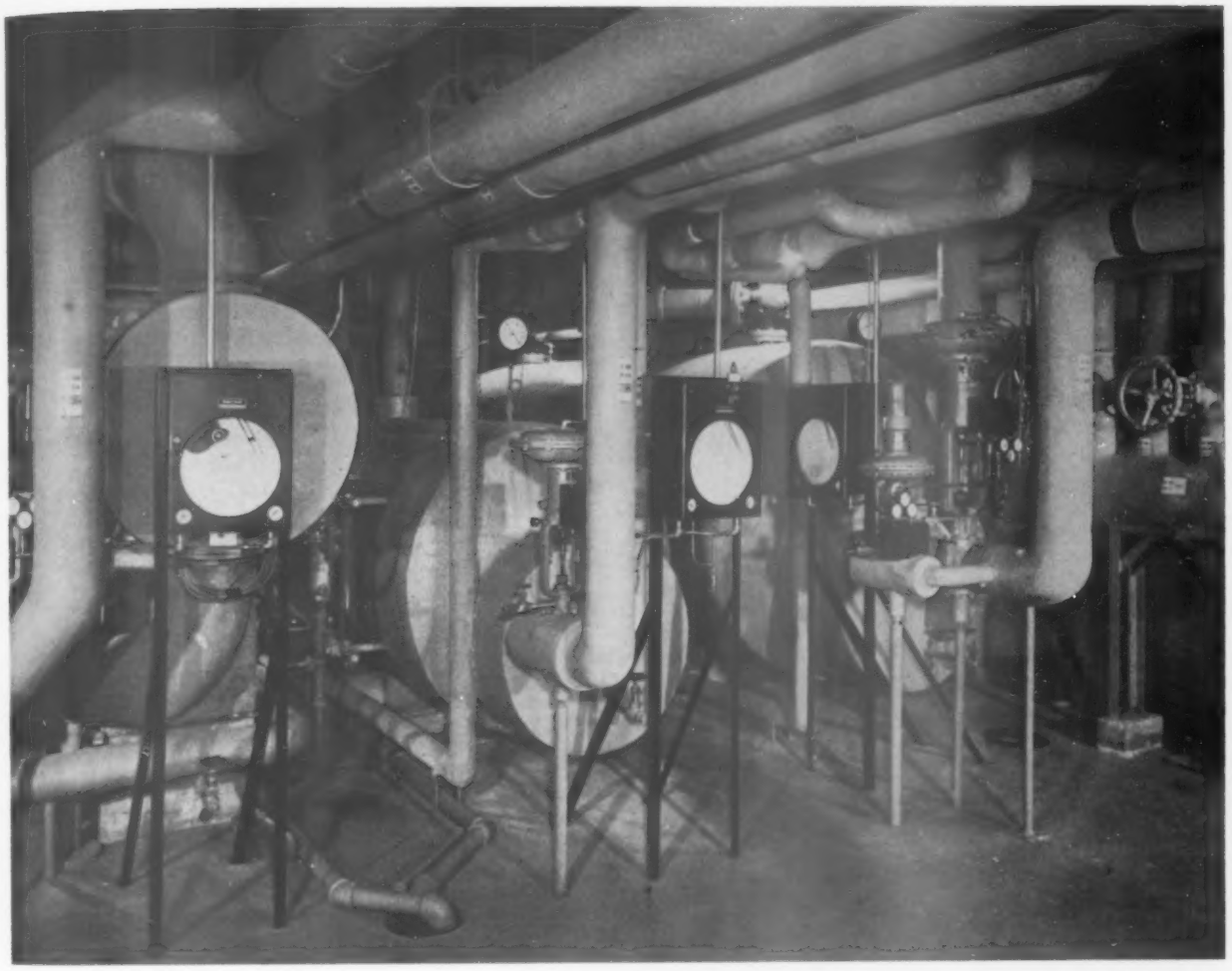
A condition which was brought to the writer's attention in 1947 had existed for many years at the College of Pharmacy in Newark, New Jersey, a Rutgers University unit. The heating system consisted of a 2-pipe vacuum system with a poor design of cast iron boiler. During moderately cold weather this boiler could not develop sufficient steam pressure to circulate the entire system. As a result many rooms were cold, unit heaters in the gymnasium did not have steam available to circulate warm air and coils in the fresh air supply for ventilation could not function for lack of steam. It was our problem to correct these con-



At the University Heights Campus of Rutgers University the existing lines of the heating system have 400-degree water. The broken lines indicate future buildings for the campus. The sewage disposal plant is located above the central boiler house.



High temperature circulating pumps are located in the Boiler House of the University Heights Campus. The pump in the foreground is electric driven. In the rear is a turbine driven pump.



The mechanical room of the Microbiology Building at Rutgers University contains a heating system convertor, a 5-lb. steam convertor, a 40-lb. steam convertor, a domestic hot water convertor, and hot water circulating pumps for two zones. There is also an ice water machine in this room.

ditions without changing the boilers, since funds were not available for this.

After some calculation and theorizing, it was decided to change the entire steam system to a 220-degree Fahrenheit water system, something we had never done or heard of being done with a system of this size in almost 30 years of experience. The work was accomplished at a cost of $4,500, a good portion of which has since been recovered by fuel savings of 25 percent, while producing comfort conditions in all areas.

Originally the system used four carloads of coal per season, but this was cut to three carloads after the conversion. The system is now converted to oil and the savings continue.

Converting Five Dormitories

More recently, a group of five dormitory buildings, having a central vacuum steam heating system, showed indications of deterioration, with radiator nipples disintegrating quite regularly. This group of buildings was converted to a 240-degree Fahrenheit hot water system, and tied to a nearby low pressure boiler plant, using the same radiators and about 95 percent of the piping. It was advised that some radiators would be lost in the conversion because of higher pressure of the water system, but the life of the system that remained intact would be greatly extended.

Approximately 10 percent of the radiators were lost, as expected, but the system has been functioning very satisfactorily for several years since, with a saving of approximately $10,000 per year on labor and an increase in fuel burning efficiency. At the old rate of deterioration, all radiators would have been replaced within another ten years, but the system, with some water treatment, will probably last as long as the building.

The heat energy transmission by hot water system was labeled a failure by many steam system installers long before its completion, but engineers from our office adjusted the system when completed and it now works to perfection. With a minimum 6-degree Fahrenheit temperature last winter, the hottest water cir-

culated through the original steam sized radiators was 200 degrees Fahrenheit. Previously, the steam pressure was maintained at five to eight lbs. for circulation, which is a steam temperature of 228 degrees to 234 degrees Fahrenheit.

Normally, under minimum outside temperature conditions, there is no saving between steam or water systems. In this instance, however, there is a definite saving which, of course, is increased considerably in mild weather when water temperatures in the system can be dropped to approximately 100 degrees Fahrenheit, eliminating most overheating and excessive window opening.

Addition for Boiler Plant

In the central boiler plant for the above system, an addition is being constructed which will contain new high pressure boilers. This addition will provide another high temperature water system to supply services to a new library building now under construction and several new dormitories which are in the planning stage. Ultimately, a gymnasium and several other buildings will be added to this new high temperature system.

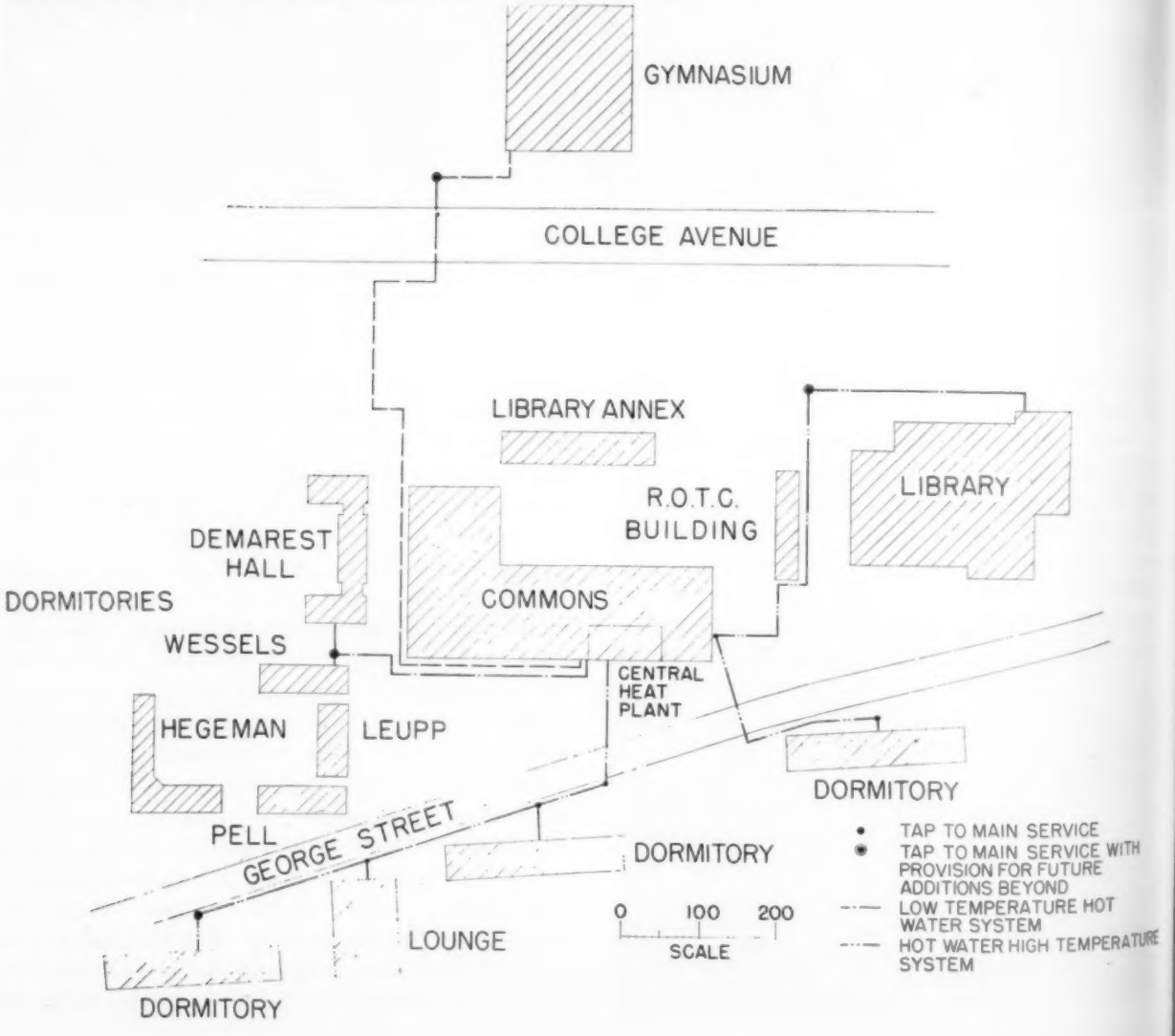
When completed, this boiler plant will become a combination plant with only high pressure steam being generated. This will be reduced to five pounds to heat the 240-degree hot water system to a new maximum of approximately 225-degrees through a convertor and with high pressure steam going directly into another convertor to make 300-degree water for the new high temperature circuit. The efficiency of the entire assembly is increasing as our load builds up, and will add much to the $10,000 saving mentioned for the dormitories. Each building will have all the plant advantages, saving on boiler room help and obtaining maximum fuel savings.

Advantages of the System

Some of the advantages of the hot water distribution system are as follows:

1. The first cost is generally lower than a steam

The New Brunswick Campus of Rutgers University has a wide network of hot water heating lines. The line from the Commons to the Gymnasium is yet to be laid.



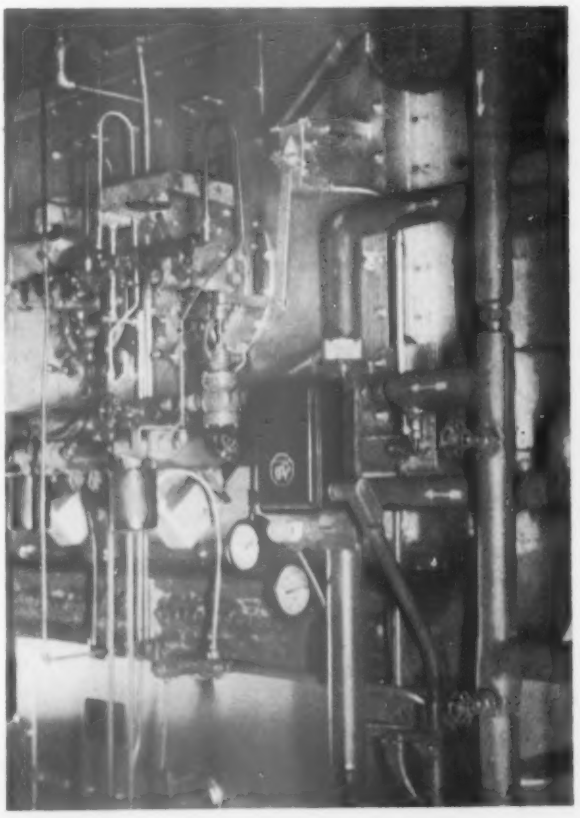


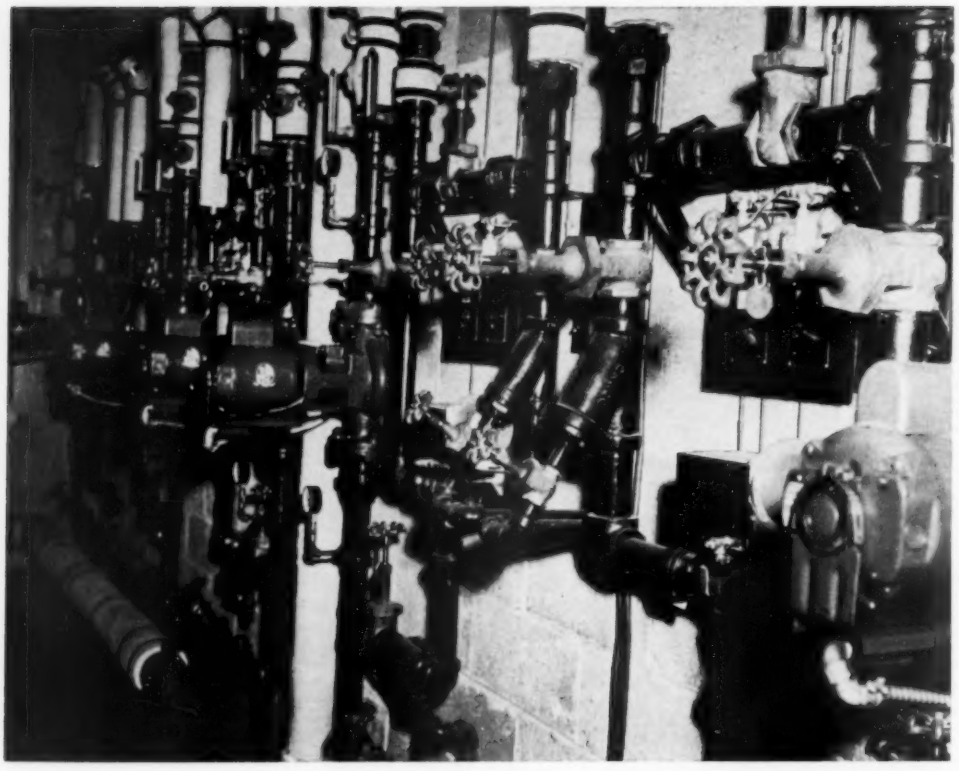
The Ralph G. Wright Laboratories constitute part of the University Heights Campus at Rutgers University. York and Sawyer, architects.

system for the same services and capacities.

2. Maintenance cost is less than for steam systems.
3. Internal corrosion and erosion in the piping, boilers and other equipment are practically eliminated with long use of the same water and virtual exclusion of air.
4. Should firing equipment fail, the heat in the circulating water will carry over for hours or days, depending on size of system and load.
5. Temperature control is easily maintained within close range.
6. Nature of the terrain where mains are run has little effect on the mains. They can be raised or lowered at will in the original design.
7. A large system with many buildings and requirements can show great economies, because each building with steam requirements over 15 lbs. can have this service 24 hours a day, without the need of licensed engineers. The convertors used for the various services come under the unfired vessel classification in all codes.
8. The load on any main may be increased considerably without replacing the mains, merely by changing the pump impeller and/or the motor in some cases, or the whole pump and motor in others.

Boilers in the University Heights Boiler House are 750-H.P. units. A 24-hour operating crew is on duty here.





The piping for the individual heating zones is connected to separate controls for each zone.

9. On large circuits, such as at Rutgers University, the space required in any building for convertors for many services is much less than would be required for a boiler room and various equipment to provide the same services. The Microbiology Building of Rutgers is an illustration of this point. Its mechanical room is 29 feet by 40 feet with 12 feet from floor slab to floor slab. It contains a low temperature hot water heating system convertor, a 5-lb. steam convertor, a 40-lb. steam convertor and a domestic hot water convertor, hot water circulating pumps for two zones and an ice water machine.
10. An advantage which many institutions might use is the possibility of converting a deteriorating steam system to a hot water system which could then have a life expectancy of 100 years or more, depending on whether or not a little water treatment is applied. The design of such a system is special and must be properly planned.

And Some Disadvantages

The disadvantages of hot water systems are:

1. Under some conditions the heat content of a water system is a disadvantage. For example, in greenhouse heating the warmth of the sun will tend to build up temperatures before the water can be cooled; and when it is necessary to get quick heat response, the hot water system will be slow to respond.
2. Should a leak occur under normal or accident conditions, the entire water content may be spilled and cause property damage.
3. Some precautions are required to avoid freezing.
4. Single systems are limited in elevation, depending on the strength of equipment at the base of the system. However, high systems may be done in steps.

RESEARCH REPORT 4

AN ANALYSIS OF TWO MULTI-PURPOSE CORRIDOR TYPES

by AL HARRIS*
WILLIAM W. CAUDILL

OUR school district has in operation two basic types of multi-purpose corridors. In this respect our position may be unique in the United States although there are a number of single cases of each type scattered throughout the country. We have often been asked, "Do these multi-purpose corridors really work and, if so, which type is better?" We answer such questions by saying, "Yes, they do have educational feasibility and whether one type is better than the other depends solely on how you wish these multi-functional spaces to perform."

In order to give school planners a more complete answer to the question, the following analysis and evaluation of our two multi-purpose corridors have been made. Teachers and principals who use the schools were called in to help us evaluate them. Even the children had a hand in the evaluation. One of the choice comments, made by a little girl who expressed the feeling of many happy children, was, "I wished I lived here."

Unfortunately we cannot contribute that statement solely to the multi-purpose corridors because both schools are pleasant places for children, but at least we can say that the multi-purpose corridors do not get in the way of the development of a humanistic architecture, and we can assure our readers that such corridors go far in providing a totally functional architecture.

*Al Harris, superintendent of the Clinton Schools, Clinton, Oklahoma, has served in that capacity since 1947. Prior to then, he was superintendent of schools at Watonga, Oklahoma. Mr. Harris received his Bachelor of Science and Bachelor of Arts degrees from Southwestern State College. He received his Master of Arts degree from George Peabody College for Teachers.

For Research Reports 1, 2 and 3 consult *American School and University* 1954–55, Volume 26, pp. 433–448.

THE PROBLEM:

In their search for economy through the maximum utilization of space, school planners have seen fit to make use of the so-called multi-purpose corridor. They say there are great savings in construction dollars by making the corridor work for education. But do these multi-functional corridors really do their job, and do it well? This report is an attempt to answer that question as well as others relating to this subject.



School A, as designated in this report—the Washington Elementary School has a 28-foot width *central* multi-purpose corridor with classrooms on both sides.



School B—the Southwest Elementary School has a 10-foot *outside* multi-functional corridor with classrooms on only one side of it.

CAUDILL, ROWLETT, SCOTT
AND ASSOCIATES
ARCHITECTS-ENGINEERS
BRYAN, TEXAS, OKLAHOMA CITY, OKLA.

SCHOOL A — DOUBLE LOADED MULTI-PURPOSE CORRIDOR

• DESCRIPTION

Washington Elementary School, Clinton, Oklahoma; 6 classrooms with a 28′ double loaded multi-purpose corridor; office-stage "island" in center of corridor; cost $92,068.96; built January 1, 1952.

• FUNCTION

Serves entire student body by providing assembly space, recreation space, music activities space, exhibit area, school lobby, also serves as waiting space for principal's office, could be used as dining room, has been used as emergency classroom; also provides circulation space between classrooms.

• TEACHERS' COMMENTS

"We use it as a play area in bad weather." "It is valuable as a community center. All P.T.A. meetings are held in this area. It serves as a workshop for P.T.A. projects." "Brownie groups meet here." "Cub Scouts enjoy sack suppers, pack meetings and other activities here. There is plenty of room for stunts." "We have used it as a temporary classroom." "We have gatherings to watch television programs of general interest." "The band gives its concerts here." "Music classes are all held here."



SINGLE LOADED MULTI-PURPOSE CORRIDOR — SCHOOL B

DESCRIPTION •

Southwest Elementary School, Clinton, Oklahoma; 6 classrooms with a 10′ single loaded multi-purpose corridor; auditorium located at east end of classroom wing; cost $113,477.97; built July 15, 1952.

FUNCTION •

Serves as an expanded unit of the classroom by providing work area, individual instruction nook, locker room, pupil display space, classroom library, solarium and small group activity space. It also serves as a classroom entrance; also provides circulation space between classroom and principal's office and between classroom and auditorium.

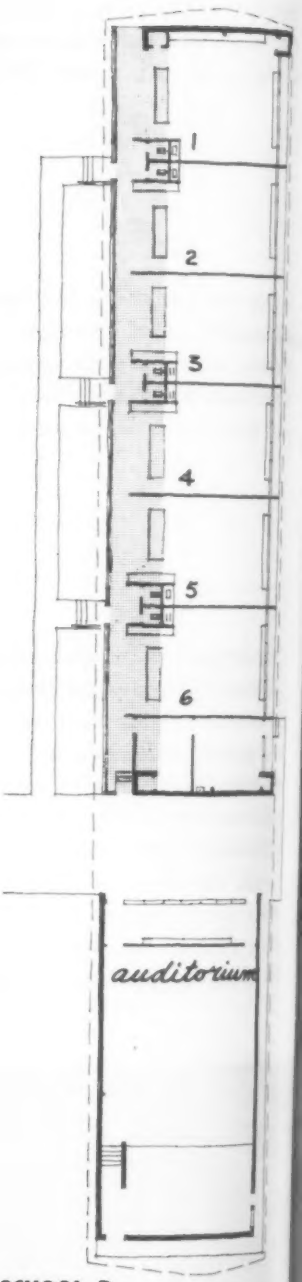
TEACHERS' COMMENTS •

"My science class observes the weather through the glass side of the corridor." "My remedial reading classes work here." "It is ideal for work on murals where several children are working together or where they are doing individual art work." "As a library it offers freedom for the children." "We use it for clay modeling and for map making." "We have planted seeds and bulbs in flower boxes and pots for study." "It is a fine place for all kinds of exhibits and displays." "On rainy days we play bingo, checkers, jacks, or work with puzzle maps." "It is an excellent place for dictionary study." "My primary children spread their blankets there during rest period. They drill with flash cards there. It is a wonderful place to prepare refreshments, too."

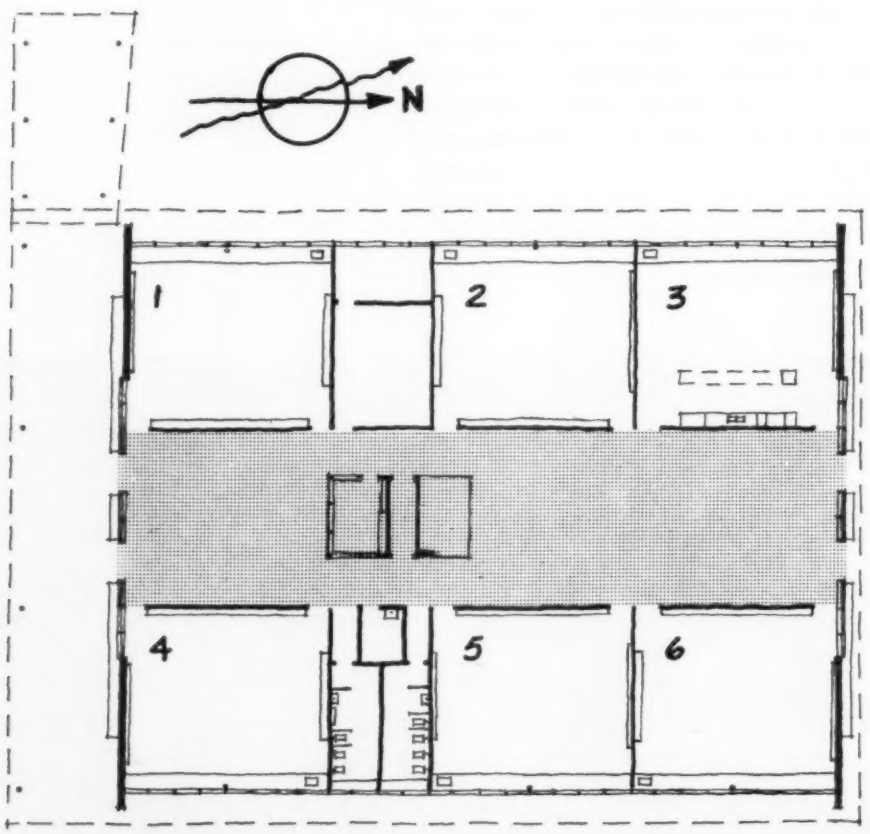


CONCLUSIONS:

- We believe that capturing corridor space and putting it to work for education has educational practicableness.
- We believe that since our school boards are having to stretch their dollars, the multi-purpose corridor should be given salient consideration in the planning of new schools.
- We believe that it is hard to reconcile space used only for walking.
- We believe that the double loaded multi-purpose corridor plan has many merits in connection with *general* school activities.
- And we also believe that the single loaded multi-purpose corridor plan has much merit in connection with expanded *classroom* activities.
- And finally we believe that both plan types are equally good provided their use is in accord with their intended purpose.



SCHOOL B



SCHOOL A

RESEARCH REPORT 5

RELATIONSHIP OF COST TO THE GEOMETRY OF A BUILDING

by JOHN M. ROWLETT
THOMAS A. BULLOCK

ANY individual with an interest in the subject of plane geometry is aware that a circle contains more area in relation to its perimeter than any other form. It is reasonable to assume that this knowledge can be applied to the plan of a building. This, however, cannot follow through to practical application, since the circular form imposes some technical difficulties in construction.

The square is the figure which, next to the circle, contains the maximum amount of area with relation to its perimeter. The square is very adaptable to methods of construction and the use of materials. We can then assume that a building erected on a square plan takes advantage of certain economies. It would not be feasible or right to arrive at the conclusion that all buildings should necessarily be built from a square plan, but wherever the building program permits, this square plan will offer many economical advantages.

A simple, rectangular building offers many of the advantages which are to be found in the erection of a square building. It may be more adaptable to some building programs than the square.

Complexity Increases Costs

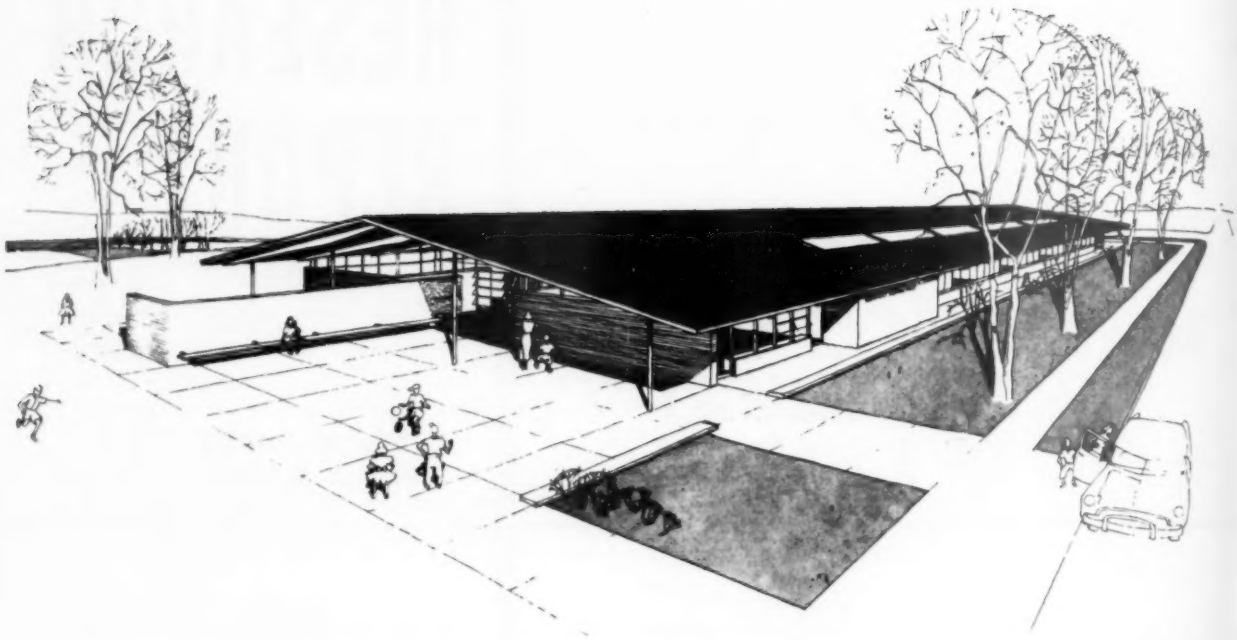
Beyond the use of these simple forms, a certain complexity is in evidence which will proportionately increase the cost of a building. For example, a building plan which has more than four corners will increase the overall cost of the building.

Our foregoing statements actually amount to the fact that simplicity in itself is a basis for economy, but we wish to emphasize that such simplicity must result in usable space. The most simple building will not necessarily function as a place of learning unless de-

THE PROBLEM:

We are now living in an era of changing society and changing economy. Much has been written and said about the effects of the tremendous increase of school population on the limited space available for the purpose of instruction. The cry for more and more space is heard from all quarters. The availability of funds to provide this space is indeed limited. One of the principal problems that has faced school planners, educators and architects alike, is how to obtain the maximum amount of quality teaching space for each building dollar. One obvious method is to approach the problem through careful analysis of pure geometrical forms.

CAUDILL, ROWLETT, SCOTT
AND ASSOCIATES
ARCHITECTS-ENGINEERS
BRYAN, TEXAS, OKLAHOMA CITY, OKLA.



Roosevelt Elementary School in Miami, Oklahoma. The architects are Caudill, Rowlett, Scott and Associates. The total cost of this school was $165,003, with all interior areas located under one roof. There are 12 outside corners to the building and 8 inside corners. The perimeter of the building is 564 linear feet.

signed with this in mind. Our firm now has proof that a school may be designed for a particular educational program and at the same time be economical because of certain simple geometrical forms.

The Miami Schools

The Miami Schools in Oklahoma were custom designed for the educational program and have now been built and put into use. It is our desire to point out the study in geometry that made each school a reality. Because of different sites each school was designed differently, although both have the same facilities consisting of twelve classrooms, administration area and assembly-lunch area.

Certain factors were the same in both schools. These were:

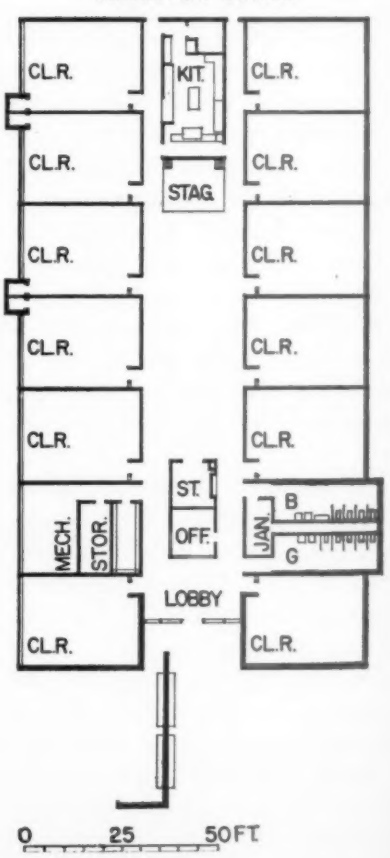
1. Bid letting date.
2. General contractor and sub-contractors.
3. Both sites are level.
4. Facilities.
5. Heating.
6. Lighting.
7. Materials.

Geometrical differences were:

Roosevelt School

1. Area: 16,592 square feet.
2. Perimeter: 564 linear feet.
3. Volume: 176,274 cubic feet.
4. Outside corners: 12.
5. Inside corners: 8.
6. Interior area under *one* roof.

Roosevelt School





Wilson Elementary School in Miami, Oklahoma, Caudill, Rowlett, Scott and Associates, architects. The total cost of Wilson School is $180,120, and all interior areas are placed under three roofs. This building is more geometrically complex than Roosevelt School and has 19 outside corners and 15 inside corners. The perimeter of the building is 803 linear feet.

Wilson School

1. Area: 17,379 square feet.
2. Perimeter: 803 linear feet.
3. Volume: 163,799 cubic feet.
4. Outside corners: 19.
5. Inside corners: 15.
6. Interior area under *three* roofs.

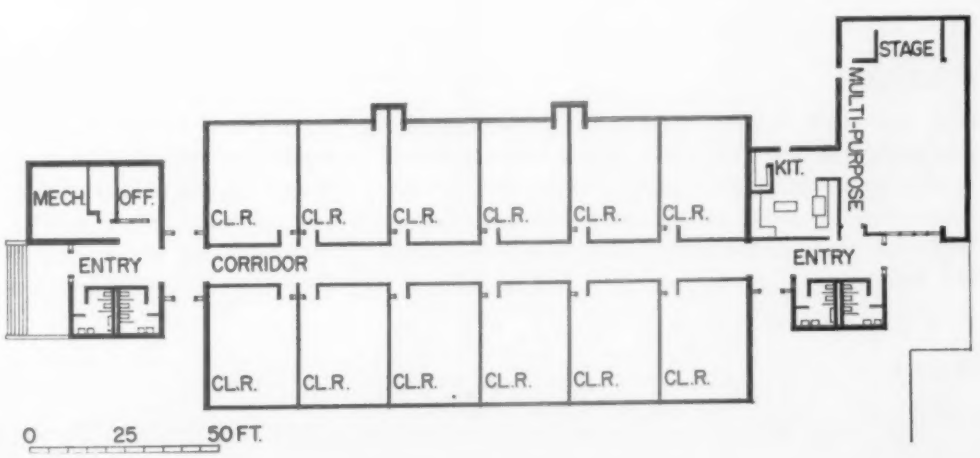
Comparison of Costs

Geometrical differences affected the actual construction cost of each school to the extent that Wilson School cost approximately 9 percent more than Roosevelt. The actual cost of Roosevelt School was $165,003.57 as compared with $180,120.09 for Wilson School. The average of all bids received indicated a savings of 14 percent.

Planned for Overall Economy

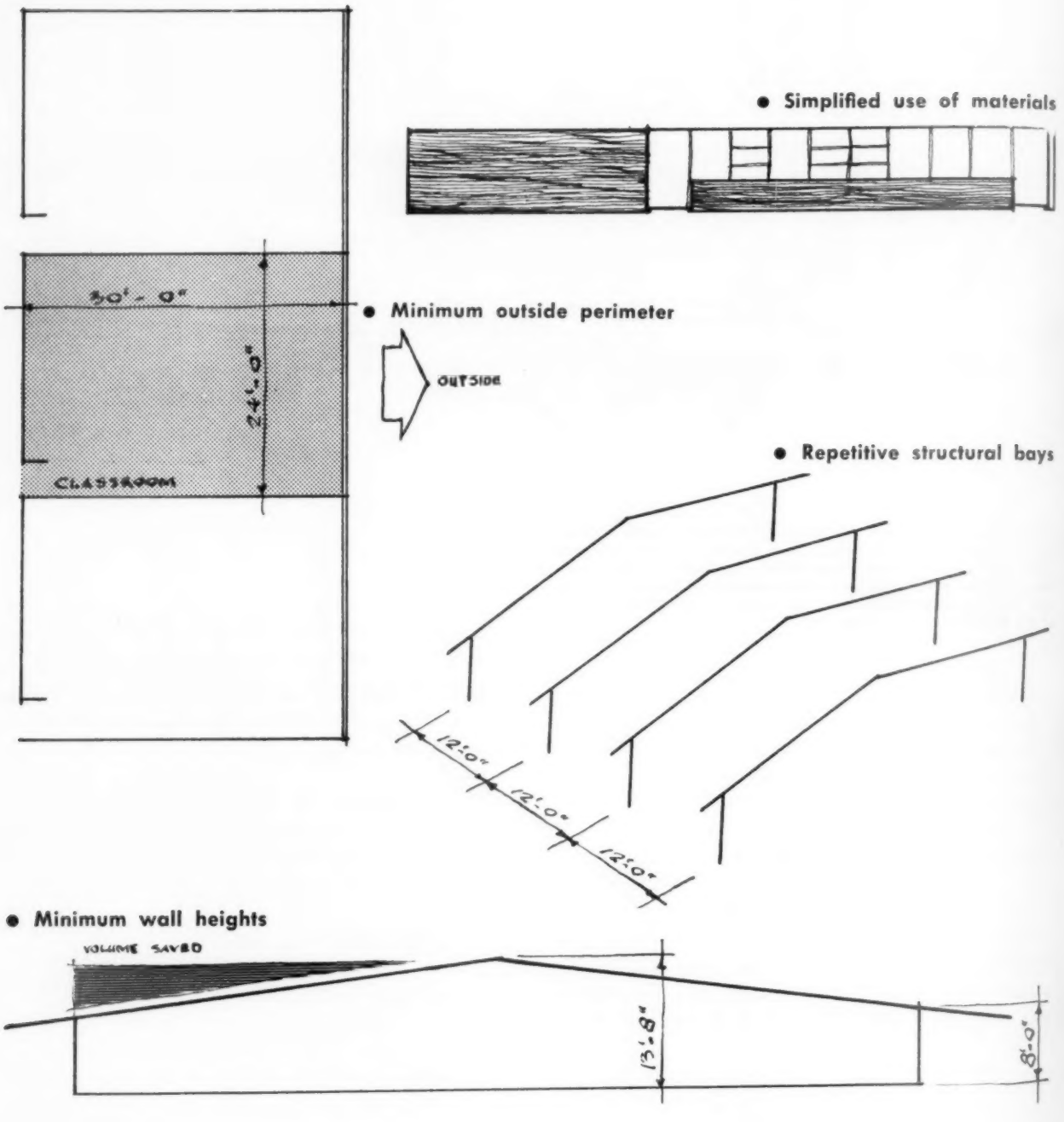
Although savings were realized in each school, we want to emphasize that both buildings consisted of planning designed for overall economy with features such as:

1. Minimum outside perimeter.
2. Simplified use of materials.
3. Repetitive structural bays.
4. Minimum wall heights.



Wilson School

WAYS OF CUTTING COSTS:



CONCLUSION:

Our approach to the problem of planning and designing the Miami Schools was a direct result of careful analysis of geometrical forms. In both we attempted to plan simple and compact school buildings and, at the same time, make sure that the buildings were completely adequate for the educational programs; but conditions of the sites made one school more geometrically complex than the other. The results to date, construction-wise and educationally, have proven that the taxpayer got the most for his money in the simpler building. Geometrical considerations made this possible.

RESEARCH REPORT 6

IMPLICATIONS OF CHILD GROWTH AND DEVELOPMENT FOR SCHOOL PLANT DESIGN

by RALPH W. CHERRY*

INTELLIGENT planning of a building of any kind must take into account the characteristics and needs of the users. School buildings may serve adults in a number of important ways but they should be planned primarily for children and youth. Therefore, school plant planners must give prime consideration to the nature and needs of children.

Extensive and exacting research in child growth and development has revealed many facts and principles which have important implications for the school plant. Some indicate how the educational program should be arranged and operated, indirectly affecting plant planning. Others provide more direct suggestions concerning the design and equipment of school buildings.

Many school plant planning teams do not include a member who is familiar with the findings of research in child growth and development. The task of securing and interpreting the information is difficult but worth the effort. This report is designed to help make the job a little easier.

It is impossible, of course, to present here a summary of all of the important findings of research which have building implications. This report attempts, then, to indicate the various types of information which can and should be obtained and to suggest some good sources for further study.

There are some general principles of development, supported by research, which have an important bear-

Dr. Cherry has been professor of educational administration at the University of Texas since September, 1954. He was formerly superintendent of schools in Owensboro, Kentucky. Prior to that he was professor of educational administration and head of the department at the University of Kentucky. He served in the U.S. Army Signal Corps in World War II. Dr. Cherry received his A.B. from Maryville College, his M.A. from the University of Kentucky and an Ed.D. degree from Teachers College, Columbia University.

THE PROBLEM:

"School plants are for children." So often we have heard that expression. But how many school planners really know and understand children—their needs, how they grow and how they develop? Very few. Yet we continue to plan plants throughout the United States with very little understanding of the young people who must use them. When we, as school planners, find out about children—our real clients—then we can expect our schools to become more truly functional, that is, schools which serve emotional functions as well as physical ones. It is hoped that this report will point a direction of study for those who believe that "school plants are for children," and that the planning of school plants must be preceded by careful study of child growth and development.

CAUDILL, ROWLETT, SCOTT
AND ASSOCIATES
ARCHITECTS-ENGINEERS
BRYAN, TEXAS, OKLAHOMA CITY, OKLA.

ing on educational practice. Four of them are presented here, with a few comments concerning their implications.

Four Basic Principles

One basic principle is that *development is a product of two factors–learning and growth.* The growth factor operates not only in the physical sphere but also in the realm of mental and social activities. The stage of growth which a child has reached determines to a great extent what he can do and will strive to do. It also affects his emotional response to various situations. This principle emphasizes the importance of adapting learning experiences and facilities to the growing abilities of the child. To provide the right opportunities–equipment, facilities, encouragement and guidance–at the right time requires a knowledge of the range of abilities at each stage of growth. Research has not given complete answers to these questions but has revealed a great many facts which have not yet been accorded the attention they deserve.

A second principle is that *human growth and development follow an orderly pattern.* The sequence of events is likely to be much the same in all children in the process of development toward maturity. It is possible to establish age and sequence norms for children



The primary school child is full of activity, but is easily tired. The daily program should include time for quiet individual work.

of the same age or stage of growth. Such norms are very useful in planning and evaluating educational programs and facilities. They indicate how a school program or a building can be scaled to the size of the pupils.

Another principle is that *individuals differ in rate, pattern and ultimate level of development.* Here is the well known and highly significant fact of individual differences. It has a great many implications but there is one which seems all-important: an educational program designed to serve all children must include a great many activities and areas of learning and should be as flexible as possible. The provision of space and equipment for such a program is the resulting challenge to school plant planners.

The fourth and final principle to be stated here is that *all aspects of growth and development are interrelated.* For example, the development of appropriate motor skills is important to a child's social and emotional welfare. It is essential to the total development of a child that adequate opportunities and facilities for appropriate physical activities be provided. Also, emotional conditions influence social and mental behavior and vice versa. Attention to factors which have a bearing on the affective life of a child is of great importance for many reasons.

Classroom facilities should provide for a variety of activities.



Dearborn Public Schools

These four principles provide a general orientation for the interpretation and application of the specific facts learned from the study of children. We turn now to a consideration of some of the specific characteristics and needs of children of various ages.

The Primary School Child

One significant fact about a six-year-old is that he is usually confused and perplexed when introduced to a new situation or environment. The transition from home to school is difficult for many children. It is made somewhat easier if the school is a small, homelike structure rather than an imposing edifice. The neighborhood primary school is one answer to this problem. Where circumstances require that larger schools be provided, a separate wing for the primary grades is suggested.

The normal child in the primary grades is full of activity but is easily fatigued. Self-activity is his special vehicle for attaining wholesome growth. He likes and needs to handle and investigate objects. A classroom designed for sitting only has no place here. Space must be available for a variety of activities. Provision for rest periods should be made, also.

The average child in this age group is learning personal cleanliness and how to control his bodily func-

tions. He needs assistance and guidance which can be provided best if the facilities needed are a part of the classroom. The location of toilet facilities in each primary room is clearly desirable.

Normally, the period from age six to nine or ten is one of slow, steady growth and development. Not much that is helpful to the school plant planner has been revealed by research concerning the middle and late years of childhood. Many of the facts about younger children apply with considerably less force, however. Classrooms should continue to provide space for learning by doing and should be made as attractive and comfortable as possible. Whether toilets should be placed in the individual rooms or in a central but readily accessible location is a moot point.

The Pre-Adolescent

The play activities of older children require more space and equipment and more attention to the differing interests and needs of boys and girls. The importance of motor learnings at all stages of growth has already been mentioned. The need is particularly great in the period of middle and late childhood. Adequate space and equipment is imperative.

A thumb-nail sketch of the pre-adolescent in grades six, seven or eight includes:

- Secondary sex characteristics begin to develop. Girls mature from one to two years earlier than boys.
- Muscular growth is rapid.
- Uneven growth of different parts of the body makes for awkwardness, restlessness, laziness.
- Appetite is enormous.
- Individual differences are great.
- Special interests emerge.
- Acceptance by peer group assumes great importance.
- Adjustment to a changing body is a serious problem for many.
- A desire for increasing independence is apparent.

The special characteristics of the pre-adolescent offer definite suggestions to planners of programs and buildings. In the first place, it is clear that the personal and social problems of boys and girls are of paramount importance. Opportunities and facilities for individual counseling and for social learnings should be provided. Second, to meet the problems created by the wide range of individual differences in abilities, needs and interests, a flexible program embodying many types of activities is demanded.

The conventional, departmentalized program is not appropriate to the needs of this age group. Yet there are some valid, practical objections to the single-teacher-per-class idea. Emerging special interests of the pre-teens should not be ignored. Perhaps the solution is a gradual transition from the self-contained classroom of the elementary school to a departmentalized program in the last two years of high school. Decisions on these points, which must be made locally, will carry with them some implications for classroom design and equipment.

A third special problem of the pre-adolescent, which demands attention, is food—lots of it. They want it and need it in great quantities. A well equipped, attractive lunchroom is a must. Snack bars are desirable and should be planned if possible. A fourth need is for physical facilities and programs which will help the boy or girl to overcome the awkwardness so characteristic of this period.

The Adolescent

Many of these same problems and needs continue into adolescence. Acceptance by the peer group, for example, becomes even more important. Physiological changes are pretty well completed but concern with these changes persists. The range of individual differences increases and special interests become more pronounced. Boys begin to catch up with girls in pubescent changes, but girls are still more advanced in many ways. The desire for independence grows stronger, but the assurance of security remains important.

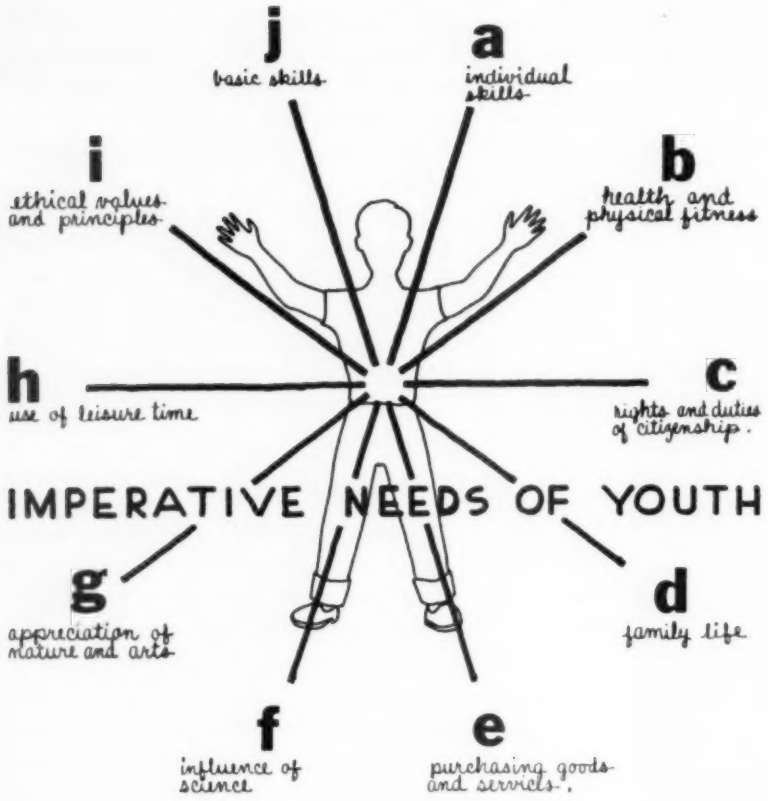


Standard Oil Company

A special problem of pre-adolescents is satisfying their enormous appetites. They want and must have great quantities of good food.

Recent proposals to change the curriculum of the high school by taking into account the special needs and characteristics of adolescents have had little effect on practice to date. Such changes are sure to come, however. Unless plant designers try to foresee them, the high school buildings constructed this year and next will soon be obsolete.

Facing this dilemma, the architects of the recently completed Norman, Oklahoma, High School adopted the approach of utilizing a statement of "the ten imperative needs of youth." This statement, contained in a pamphlet called "Planning for American Youth," is



The ten imperative needs of youth form a basis for curriculum planning and school design. The ten needs are adapted from the book, *Education for All American Youth*, published by the Educational Policies Commission.

derived from a book published by the Educational Policies Commission, entitled *Education for All American Youth*. A revised edition of the latter is now available and is included in the references listed below. This statement of the needs of youth is an attempt to translate what we know about adolescents into a form which will serve as a basis for curriculum planning.

The point is that a high school, designed in accordance with the needs and characteristics of youth, will be somewhat different from one planned to serve the present curriculum. School plant planners, with an eye to the future, must look for guidance directly at the known facts about youth. One suggestion is to involve youth in the planning.

Common Needs of All Children

Some common needs of children of all ages must also be considered in the planning of school buildings. Physical comfort, safety and health are a main concern. No building can be considered good unless it provides for the visual comfort and efficiency of every child wherever he sits and whatever he does. New standards have been derived from a great deal of excellent research. The real test is not whether certain standards (foot-candles, brightness-balance or what-have-you) are met, but whether every child can see well enough to do what is planned without strain.

A satisfactory thermal environment is equally important and the test is the same—the comfort and health of the pupils. In this connection, the stubborn fact is that children's comfort demands somewhat lower temperatures than are commonly maintained in classrooms. Adults have a basal metabolism rate which is lower and thus require higher temperatures. Women require a higher room temperature than men for the same reason. As yet, however, no one claims to know all of the answers. For now, it is best to rely upon the latest technical knowledge available and continue to check the effects on pupils.

Good hearing conditions are also essential. The test is whether or not pupils can hear what is meant to be heard and are undisturbed by extraneous sounds. With reference to the latter, it can be said with certainty that noises unrelated to the learning process reduce learning efficiency and frequently produce irritation. Children differ greatly in their reaction to noise, but it is known to reduce accomplishment and increase error. Achieving the desired result is a complex, technical problem.

Scaling every feature of the building and every piece of equipment to the size of pupils is still another factor. Information about the height of the average child can be obtained from the department of health or from a physician. These measurements should be checked locally and translated into specifications for furniture and equipment, doorknobs, sinks and so on. Equipment manufacturers have done a part of this job. Testing by pupils is recommended, too.

The psychological comfort of pupils is a problem which is just beginning to be recognized. Not much



High school students need informal areas where they can meet with each other and with their teachers in a relaxed and social atmosphere. This student lounge is located in the Evanston Township High School, Evanston, Illinois, Perkins and Will, Architects-Engineers.

Hedrich-Blessing

Chicago Public Schools



Use of the outdoors livens the day's activities for adolescents and helps to relieve any feelings of rigid authority being imposed on them by the school program.

definite evidence is available as yet. This fact makes it all the more important to use all that we do know. To create a cheerful, friendly atmosphere is one goal. Color and other means of decoration get into the picture. What children like should be considered. Saturated colors appeal to the young child while adolescents prefer pastels. Colors akin to those found in nature seem most desirable. A few attractive pictures (to children, that is) add something to a room, as do growing plants. And all of this should be harmonious in the eyes of the child.

The Child Is the Yardstick

The point of all that has been said in this report is simply that the child is the only yardstick by which a building can be properly measured and evaluated. That being true, why not learn all that we can about children before or during the planning of a building?

For Further Study:

A. General References

1. Gesell, Arnold and Ilg, Frances L. *The Child from Five to Ten.* New York: Harper, 1943. A detailed report, based chiefly on studies in the clinic at Yale University.
2. Jenkins, Gladys G., Shacter, Helen and Bauer, William W. *These Are Your Children.* Chicago: Scott-Foresman and Co., 1949. A synthesis of research findings, organized by age levels.
3. Jersild, Arthur T. *Child Psychology.* 3rd edition. New York: Prentice-Hall, 1947. A statement of principles and brief reports of various research studies.
4. Jersild, Arthur T. and Associates. *Child Development and the Curriculum.* New York: Bureau of Publications, Teachers College, Columbia University, 1946. A brief analysis and interpretation of research with implications for the curriculum. Covers the span from infancy through adolescence.
5. Olson, Willard C. *Child Development.* Boston: D. C. Heath and Co., 1949. Analyzes the various aspects of development with emphasis on the elementary school child.
6. Otto, Henry J. *Elementary School Organization and Administration.* 3rd edition. New York: Appleton-Century-Crofts, 1954. Contains an excellent but very brief statement of the characteristics of elementary school children. See pages 47–58 inclusive.

B. Special References

Caudill, William W. "An Approach to Design of a High School," *American School and University* 25. 1953–54. pp. 395–402. A "needs" approach to design is described.

Educational Policies Commission. *Education for All American Youth—A Further Look.* Washington, D. C.: National Education Association, 1952. Proposals for a curriculum based directly upon the needs of youth.

Engelhardt, N. L., Jr. "The Working Heights of Elementary School Children," *American School and University* 22. 1950–51. pp. 349, 350. Presents a chart showing appropriate heights of building appurtenances, built-in fixtures and equipment for each grade level, assuming certain standing heights of children.

Herrington, L. P. "Effect of Thermal Environment on Human Action," *American School and University* 24. 1952–53. pp. 367–376.



RESEARCH REPORT 7

"GLASS WALLS" AND THE INSTRUCTIONAL PROGRAM

by PAUL R. HENSARLING*

"SIT down and get busy!" This is a reprimand which was heard often as Johnny stretched his neck to peer outside his schoolroom. But we have advanced in our knowledge of how children learn, and we know now that Johnny's interest in outside happenings is a key to his interest in things academic.

Until recently, architects and educators were reluctant to change from the conventional classroom style—three solid walls plus one with windows, purposely designed to obscure students' views of the world about them. Two years ago, when architects, administrators and teachers of the Port Arthur schools sat down to discuss new schools, the methods and philosophies of teaching became major considerations. As a result, three elementary schools were planned and built which literally bring the "outside in." This was accomplished with the liberal use of glass, rejecting the conventional classroom style of the past.

These three schools, William B. Travis, Sam Houston and Phillis Wheatley, have been in operation for two, one and a half, and one year, respectively. We believe that, by now, whether or not the "open type" classroom helps or hinders the instructional program, can be determined.

Paul R. Hensarling is Director of Administrative Research and School-Community Relations for the Port Arthur, Texas, Independent School District. He has had a cross section of professional experience, having taught elementary, junior and senior high school grades, and has served as principal of both elementary and secondary schools. He has held his present position since 1950. Mr. Hensarling received a B.S. degree in Business Administration and an M.S. in School Administration at North Texas State Teachers College in Denton. He has completed further graduate study at Columbia University, the Universities of Colorado and Missouri, and the University of Houston, where he expects to complete a doctoral program. *The author wishes to acknowledge the assistance of Mr. Z. T. Fortescue, superintendent of the Port Arthur Schools, the principals and the teachers of the three schools discussed in this report.*

THE PROBLEM:

Does the extensive use of glass surfaces in school building construction *help* or *hinder* the instructional program? To discover the answer to this question, forty-five teachers, working in classrooms which have walls of glass, were asked to express their opinions about them. Parents and children were also interviewed to obtain their reactions to these classrooms.

This study was made in connection with the Port Arthur, Texas, school system which recently built three new elementary buildings. These schools probably contain more glass surfaces than any other schools in the nation. They have been appropriately called "showcase schools." Like any departure from the usual, the design of the buildings has stirred up many questions:

- **What are the advantages of such extensive use of glass?**
- **How do children respond to "outside" activities which are visible from the classroom?**
- **What are the teachers' personal reactions to the open type classroom?**
- **Have school patrons accepted the change?**
- **What about economy? Maintenance? Safety?**

This report, we believe, answers these and other related questions.

CAUDILL, ROWLETT, SCOTT AND ASSOCIATES
ARCHITECTS-ENGINEERS
BRYAN, TEXAS, OKLAHOMA CITY, OKLA.

Ulric-Meisel



The Phillis Wheatley School is one of three new schools in Port Arthur, Texas, where "window walls" are part of all the classrooms.

The persons best qualified to make this analysis are the teachers, students, parents and principals who use the buildings. The purpose of this report is to summarize the results of a study of the experiences of these people. This should indicate the degree of success of "glass walls" in classrooms in relation to the objectives of the instructional program.

What Are the Teaching Advantages?

Forty-four of forty-five teachers say that glass walls do have educational feasibility. Here are some typical comments:

"Children do not get tired and restless because there is no feeling of confinement."

"Many of our studies in the class can be observed in real life through the glass areas of the room."

"There is a transformation of the classroom from a place of repression into one of freedom."

"When children are given the opportunity to see what is going on around them, they develop new interests which can be channeled into academic study."

"The lighter, brighter surroundings create a good environment for learning. This encourages the children to be better citizens and to take pride in their schools."

"The studies of nature, the seasons of the year, rain, clouds, etc., are enriched because the whole outside is our observatory."

"My students seem to be more natural and relaxed. This type of classroom offers a release from stress and tension."

One student summed up the general feeling of all when he said, "Unlike my old room, I can see outside when I wish. I don't feel 'cooped up.' We use many outside things in our studies. The days seem shorter and all the kids like school now."

Are There Disadvantages?

Yes, teachers listed several. Glass in adjacent wings often causes glare. Some teachers say the "day dreamers" have fertile territory for thoughts "outside." "Sometimes the activities outside do not relate to our study at the moment," one teacher said, "such as other classes working in their gardens, the maintenance worker mowing the grass, and an exciting ball game in PE class. These distractions outside are not of great consequence," she concluded, "and may even be better education than what we are doing at the moment inside."

The William B. Travis School has now been in operation for two years. Its pupils and teachers had much to report about its walls of glass.



Another disadvantage mentioned by several teachers is the difficulty in darkening the rooms for visual aids.

Effect on the Learning Environment

Teachers list the following as typical teaching aids:

The rooms are better adapted to the teaching of nature and science.

Classroom activities can be better related to community life.

The beauty of the outdoors—trees, shrubbery, flowers, grass—add to pleasant surroundings.

Shadows, sky, clouds, houses, birds, automobiles, airplanes, furnish subjects and perspective for art work.

Creates a relaxed atmosphere.

More like home; pupils are at ease, unregimented.

Improves appreciation of aesthetic values.

Specific examples of integrating the outdoors with the instructional program include:

"Our unit on "The Farm" is brought to life by the passing of farm machinery, all kinds of farm animals, and trucks loaded with farm products."

"Our flower bed is just outside the room in full view of the class at all times. The students take great pride in watching their plants grow."

"The unit on 'The Weather' is only supplemented by the books we read, for the whole outdoors is our observatory—temperature, wind, sun, rain, clouds—all in close relation to the seasonal plants, insects and habits of the animals. We anticipate the migration of birds, ducks and geese."

"My class was stimulated to make a complete study of birds when they were attracted by the unusual songs of one outside our window."

Pupil Response to Hall Activities

One of the usual questions asked by our first time visitors is, "How do the children respond to the hall activities which are completely visible through the 'glass wall'?" Teachers say:

"When we first moved into our new building from the old one, the hall activities were distracting. This was temporary. Pupils have learned to concentrate on the work at hand. There may be a casual glance by a few students, but this does not seem to disturb them."

"Since the corridors are in full view from all angles, both students and adults conduct themselves in an orderly manner."

"A little variety afforded by hall activities seems to brighten the day, resulting in less fatigue."

"Now that my students know they can see out, they pay very little attention to activity in the hall. I can remember that in my old room there was more noise from the hall. This was annoying because the students could hear but could not satisfy their curiosity by seeing."

"Our class is always pleased when persons in the hall stop to inspect our ledge displays."

Then, there is the reverse aspect to classrooms with glass walls. In addition to being able to see from the inside out, the teacher and her class are always on display. Parents, other teachers, supervisors, children from other classes—all can observe casually or studiously, unannounced and without invitation. Upon first consideration this situation sounds terrifying!

What Teachers Think

Here is what teachers think about being observed from the hall:

"After the first few weeks of teaching in the new building, both the students and I were oblivious to being observed by persons in the hall."

"It does not disturb me; probably keeps me on my toes to do a better job at all times."

"I never think about it now."

"It creates a greater pride to know that others are seeing us at work. In the old building I felt isolated—seldom knew whether what I was doing was approved or disapproved. I certainly do not have this problem now."

"I'd rather visitors would observe from the outside. There is less effect upon our natural working habits and routine. I feel no obligation to stop my work to greet visitors."

"Visitors can observe how the children and teacher work together in normal every day activities —no planned or gilt-edged show."

"I think this is a good idea. Of course, there is no time for lagging, but a good teacher should do her best work at all times."

Ulric-Meisel



The classrooms of the Sam Houston Elementary School are always open to the outdoors because of their wide-paneled window walls of glass.

How do teachers feel about being observed by other teachers? Their answers to this question proved quite interesting. Forty-two of the forty-five teachers who participated in the survey said they particularly observe the bulletin displays in the rooms of fellow teachers. Thirty-eight said they observe to determine what unit of work is being studied. According to the questionnaire, teachers also observe prepared charts, work on the chalkboards, student activities, student response to teaching, the teacher's manner of handling children, housekeeping (general orderliness), how the teacher is dressed, seating arrangement, window and ledge displays, and living things of interest such as plants, fish, frogs, turtles, snails, etc.

It is obvious from this report that teachers take advantage of the glass wall between the classrooms and

Rice Studio



1

Children inspect objects made by other classes and are inspired by them. The freedom of activity of the children does not distract the class within.



2

Class study of "The Farm" is brought to life by observing the farm implements and animals which pass the school. The first grade class is interested in a horse-drawn mower.

J. C. Watkins



3

Large plate glass windows are ideal for studying the weather. This class is studying the formation of the clouds.

Rice Studio



4

Teachers welcome the opportunity to observe other teachers and classes in session. They learn from each other and are stimulated to do their best work at all times.



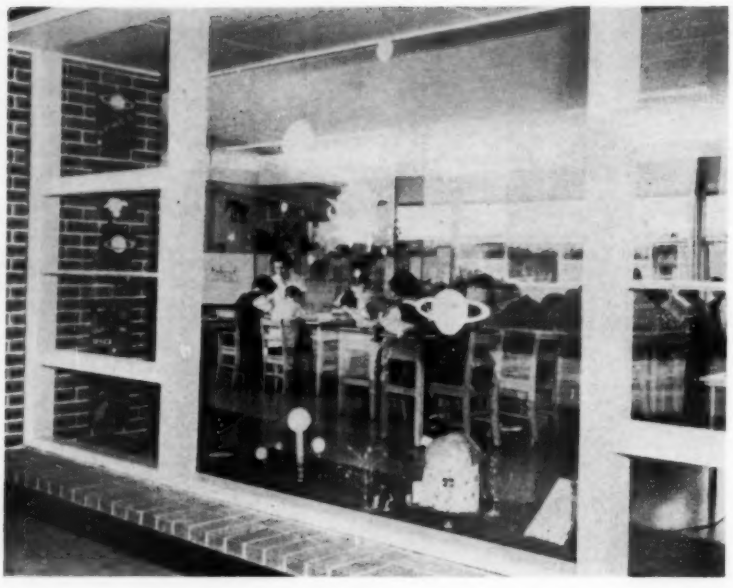
5

Kindergarten children have their private outside play area. Diversified activities take place indoors and out while the teacher supervises the two glass-separated areas as one room.



6

Unnoticed, a parent watches her child at work with others. Children are not self-conscious when a parent observes the class from the window wall.



7

The large window panel is adapted to class study of the universe. Ledge displays and window cutouts form a miniature universe.

corridors to observe their fellow teachers, either casually or purposefully.

Forty of forty-five teachers said they are stimulated by activities they have seen in other teachers' rooms. Also, thirty-six of them said that students likewise have been stimulated.

The Effect on Teacher Morale

It is human nature to strive for the approval of one's peers. A teacher is motivated when fellow teachers compliment the work they have observed in her room. Forty-four teachers in the survey say that other teachers have mentioned to them something they have seen in their rooms. One teacher said, "This creates wholesome conversation in our teachers' lounge." It has been said that the first principle of developing a friend is to express interest in him and his achievements. This principle evidently is being fully practiced in these schools.

Thirty-eight teachers think that there is a direct relationship between the open type classroom and general teacher morale. Seven think that there is some effect, but not much.

Using the Windows and Display Ledges

At least one panel of the wall between the corridor and the classroom is a large plate glass "picture window" similar to those in many modern homes, and they are used in a similar manner. At the base of the window is a ledge about a foot above floor level.

Teachers listed several examples of display subjects: art work, science exhibits, pottery, friezes, booklets, farm scenes, city buildings, circus parades, maps, forts, pioneers and other historical scenes.

What Do the Parents Think?

School officials were not sure how the people of the community would respond to this radical change in architecture. For years they have been accustomed to good buildings and are proud of their conventional two-story brick structures, built to last a century. It was after lengthy deliberation that the board of education approved this deviation from the usual—three new schools which are rambling, one-story, ranch type and homelike, with over half the wall space being glass.

Now, parents have seen that the new buildings are highly functional and they are our best public relations agents. Of course, they are also impressed by the reduced cost of this type of school. Some typical comments from parents are:

> "I never did like to go into my child's classroom because it makes him self-conscious. Now I can observe him at odd times from the corridor, and he never knows I'm near. Believe me, I can better understand his teacher's viewpoint now and I am able to help more."
>
> "I like to see what's going on in other rooms as I walk down the halls. By this means I can compare the work being done in my own child's room."
>
> "Most parents are reluctant or timid about school visitation. This type of school certainly hangs out a welcome sign."
>
> "I see more parents in the building now than ever before. The subject of conversation usually is a mutual pride in their school."

Parents actually are learning more about the curriculum; there is a marked improvement in their understanding. This is noticeable in their discussion in groups, and with teachers and principals. We believe the convenience of observing has affected this improvement.

Even the building style is conducive to good public relations. It has an atmosphere of friendliness,

an invitation to see and learn the inner workings of the school. Uncles, aunts and grandparents of the students feel free to visit. At Christmas time all rooms are appropriately decorated. The week before school closes for the holidays, the Christmas lights are turned on at night for about two hours. Many cars can be seen in line as people of the community enjoy the beautifully lighted and decorated classrooms. It is at times such as these that public relations reach a peak of success.

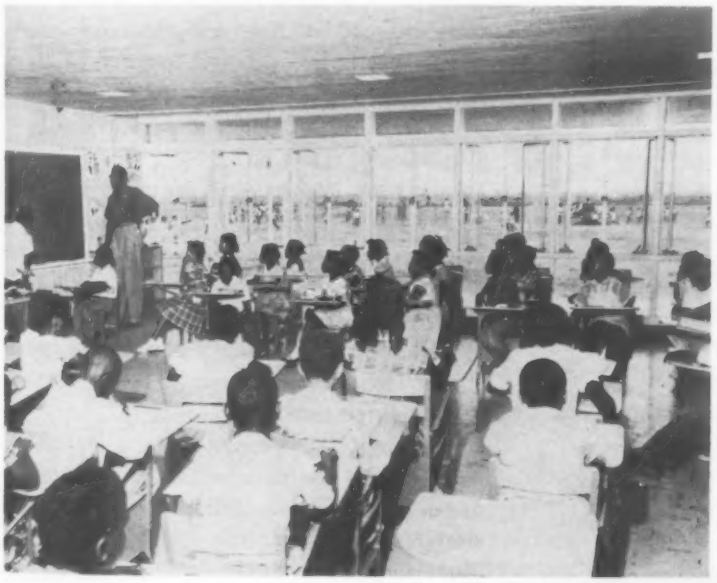
Maintenance and Replacement

School administrators and businessmen, upon inspection of these new schools, usually ask, "How about maintenance and replacement?" This would seem to be a big item with so much glass. It does require more care, but the cost is no greater. Plain walls get dirty, but the same dust or sticky hand prints are more visible on glass. Once there was a lazy school nurse who wanted her clinic furniture painted brown because white "shows dirt so badly." Evidence which is visible requires better housekeeping.

Before grass covered the campuses of these buildings, dust accumulated quickly on the outside of the windows. They required washing down often. When it was dry enough to be dusty, the flowers and shrubs beneath the windows needed watering.

Should we include housekeeping in the course of study? Housekeeping is a part of living. When incorporated as a class responsibility and based on pride for the school, it becomes fun and, at the same time, educational. Most of the teachers in these new buildings have inspired their children to feel that classroom housekeeping is their responsibility. What do parents think of this idea? They say there is good transfer resulting in more pride in keeping things orderly at home.

Little fellows in the primary grades cannot clean the high places. Here is where the practice of being



8

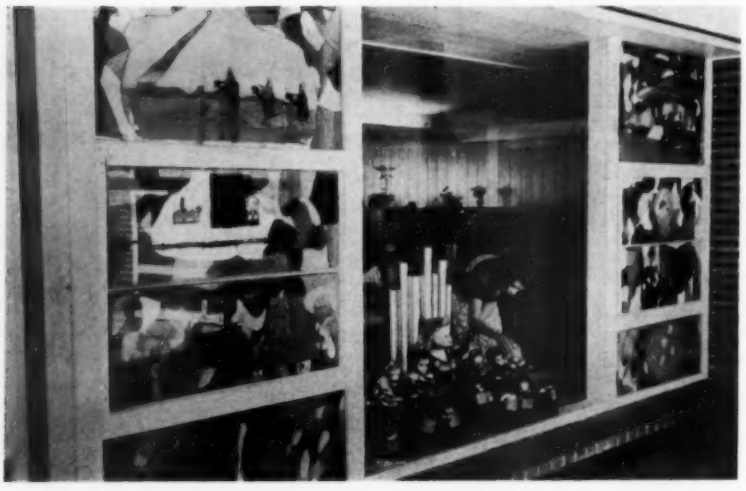
The horizon becomes the bounds of the classroom and learning situation. Children's attention is divided between inside and outside activities only casually and normally.



9

Children learn about the community by observation from their classrooms. Kindergarten children interrupt their play to watch the mail delivery at the school.

Rice Studio



10

The glass walls between the classrooms and the corridors are adaptable to tempera paint and for the display of art work.

a good neighbor can be taught. Periodically, larger children in upper grades help the children of the lower grades with their cleaning tasks. Such a good turn can be a choice assignment, if handled properly.

Breakage and Replacement

There has been no more breakage than in other buildings. At the end of two years of service only one of the large windows has been replaced. This one was broken by a flying rock from the power mower. There have been a few glass sections broken during the opening and closing of windows. The cost of this item has proved to be nominal, according to the property superintendent.

Are the "Glass" Buildings Safe?

So far, no accidents are attributable to the different design of these buildings. Sometimes a Gulf Coast hurricane strikes this area. There have been none since the three buildings were erected. Some say, "Wait till a hurricane hits!" The architects say, "These buildings will hold up as well or better than the downtown stores with their profit making glass façades." Time will tell. We have good reason to believe that the extensive use of glass will not be a negative factor.

CONCLUSIONS:

Some of the data in this report are based on observation and interview; most of the facts are taken from a written survey in which all teachers in the three new schools participated. Their reports purposely were unsigned or unidentified. Although the reports include some adverse criticism, forty-four of the forty-five teachers are highly pleased with the "show case" type schools. It is expected that the teachers eventually will take full advantage of the functional design of the schools.

Therefore, these things seem evident:

1. The extensive use of glass not only adapts itself to a modern program of education, but actually motivates the educating process.
2. Children who spend their elementary school years in these buildings will have had excellent opportunity to become well rounded citizens.
3. The "open type" classroom expands opportunity for new learning situations as opposed to the distraction of attention.
4. Teachers are inspired and are more alert to do a good job of teaching.
5. Teachers and students learn new ideas from their observation of work being done in other classrooms.
6. Teacher morale is improved by the general atmosphere. There is opportunity for discussion of mutual interests.
7. Parents and other people of the community are pleased with the new buildings. The extensive use of glass affords new opportunities for public relations.
8. The initial cost of the three buildings was below the cost of the conventional type. At the end of two years of operation the cost of maintenance is nominal and no more than the conventional type.
9. The safety of glass has not been put to a severe test. There are no inherent dangers in its use.
10. Some changes will be made when additional new buildings are built. This would be true regardless of the type of the building. As to principle, Port Arthur probably will continue to use glass extensively in future buildings. We think it is highly functional.

And in conclusion it should be remembered that more learning takes place when the classroom is bounded only by the horizon, and that Johnny should be able to view it all from where he sits.

A SYMPOSIUM OF GOOD MAINTENANCE PRACTICES

CARE OF SCHOOL FURNITURE

by R. H. PARK

Assistant Superintendent in Charge of Operation and Maintenance, Lincoln, Nebraska

THE Lincoln Public School district includes an area of approximately 30 square miles. In this area are 22 elementary schools, 3 junior high schools and 3 senior high schools. The furniture repair shop for these buildings is in the Lincoln High School, which has a central location with reference to the other schools. Here construction of new furniture and repairs on large pieces of used furniture are carried out in the industrial arts carpentry shop. Small pieces of furniture are repaired in a basement area used only by the maintenance carpentry shop.

We follow two plans in the repair and maintenance of furniture:

1. Furniture that is broken in use is usually transferred to the central shop for repair.
2. All furniture is scheduled by schools for refinishing every eight years. This is done at the various buildings.

Furniture Repairs

Any furniture, broken or damaged in use, which requires some type of machine work is removed to the central shop. A workman on the carpentry crew makes the necessary repair and the piece of furniture is turned over to the paint crew for either finishing the broken part to match the rest of the finish, or for redoing the entire piece of furniture. This decision is left to the paint foreman. As soon as the repair is completed the furniture is returned to the school.

The Eight Year Plan

The refinishing of furniture under the eight year plan is done at the individual buildings during either a holiday period or the summer vacation. The crews for this task consist of:

1. Four women to wash furniture.
2. Five men to remove varnish, fill and stain the furniture.
3. Four men to varnish furniture.

The furniture is thoroughly washed. Then the sanding crew sands any damaged area, particularly corners where slivers occur. Tops of desks which are badly chipped have the varnish removed with varnish remover and are sanded and restained. Tops with bad cuts or other markings are resanded and cuts that are too deep for sanding are filled with plastic wood or similar material. All tops and seats for sanding are filled with a paste filler.

All desk tops and seats are given two coats of good grade furniture varnish. The sides and other parts not receiving much wear are given only one coat of varnish.

During the preparation for varnishing, any furniture needing repairs is returned to the central shop. However, in cases where most of the repairing involves only regluing, a workman may do this at the building.

The refinishing of old or marred desks and chairs is a repair task usually scheduled to be done during school summer vacations.



USE OF PRESSURE SENSITIVE TAPE FOR LINING GYM FLOORS

by HOWARD A. STINGLE

Superintendent, Buildings and Grounds, Spokane Public Schools, Spokane, Washington

GYMNASIUMS of the Spokane, Washington, public schools are also used for cafeteria purposes. The floors are covered with battleship linoleum and it was necessary to have the game lines painted each year.

In painting the lines, the first step consisted of marking a chalk line in the center of the width of each line to be painted. The floor wax was removed and a double line was drawn to mark the width of each game line. These were then painted by hand with a second coat applied 24 hours later. The average cost for this process, carried out in 45 buildings each year, amounted to $25 per floor for material and labor.

In 1953 the use of pressure sensitized tape was explored. It was found that a considerable amount of time could be saved in its application and maintenance. A chalk line is marked approximately 1½ inches to the left of center of where the finished line is to be. The floor is cleaned and wax is removed to the right of the line. The tape is applied by machine. The machine's marker is set and the tape is rolled out along the chalk line. The cost of using pressure sensitive tape to line new floors amounts to about 20 percent less than the painting method.

After One Year of Service

After one year of service, an inspection of the gymnasium floors indicated that one-third of the areas would require some patching, compared to the repainting of lines in all 45 buildings as done in the past. The repatching is a comparatively simple operation. It was found that one factor which contributed most to the wear of the tape was the movement of metal chairs over the floor. This was not caused by ordinary gymnasium or lunchroom usages.

PREVENTIVE ROOF MAINTENANCE

by GEORGE H. LADD

Maintenance Engineer, San Diego, California, Unified School District

ROOF maintenance, regardless of the total areas involved, is an item of repair work which should be handled on a preventive basis. Roofs are parts of buildings that are seldom observed and little attention will be given to their condition unless a systematic inspection and maintenance program is established.

Preventive maintenance on roofs is particularly effective in helping to locate any defects at a time when repairs can be immediately carried out. Oftentimes, this can be done before defective roofs become the cause of damage to building interiors and to materials stored within buildings, representing repair costs greater than the value of the roof itself.

A preventive roof maintenance program means having advance knowledge of the condition of building roofs, and making provisions for their repair or replacement according to a regular schedule. This will keep the roofs in good condition, with repairs and replacements planned so that the work will be done economically. Roofs will then, at all times, serve their purpose of providing protection for building interiors.

For small areas or individual buildings where the person in charge is aware of the roofing problem, a preventive program involves very little except knowledge of roofs and good judgment. However, if the problem is that of maintaining large areas at numerous sites, some systematic approach is necessary in order to insure the results desired.

An Effective Program

No doubt different methods of inspection and record keeping could be developed that would each be satisfactory. The following program, which has been very effective in San Diego, is recommended for consideration:

1. Prepare plot plans for all roof areas at each site. These need not be detailed plans, and preferably should consist of an 8½-inch by 11-inch sheet for each site, showing roof areas in their proper relation. Sections representing different buildings should be given code numbers. If different types of roofs are located on the same building, they should be so indicated. The type of roof in each area should be shown on the plans.

2. A survey should be made of all the roofing areas and a proper tabulation made on the plot plans by areas, classifying the condition as good, fair or bad.

3. Plans should be made for repairs or replacements on all roofs classified as bad, and an estimate should be made of the future durability of those areas qualified as fair.

4. The necessary repairs or type of roof replacement must be decided upon for those areas classified as bad and requiring attention. Estimates for the total cost are based on the areas and the type of replacement or repair selected. Average costs per square foot for different types of repairs or replacements are usually set for this purpose, although the exact cost and details of some roof repairs cannot be determined until the work is in progress or the old roof is removed.

5. In determining the type of roof replacement several elements of judgment are involved. Certain types of damaged shingles or tile roofs on older buildings can be put in good condition by repairing with the same material originally installed. Newer roofs and most of the total areas involved on school buildings usually consist of built-up composition roofs of some type or other. There are many different types available at various prices.

A regular schedule of roof inspection and repair will keep roofs in good condition.



We can almost always expect to get what we are able to pay for in terms of number of years of service, and the type of roof selected will usually depend upon the funds available or the planned usage of the building. Certainly, it would not be good judgment to install a 20-year roof on a temporary building or on a building that was approaching the end of its life expectancy.

Normally, if funds are available and the building will be in use for many years, the most economical roof that can be purchased is the one to buy. Better quality roofs undoubtedly have a slightly lower average cost per year and the inconvenience of replacing them at more frequent intervals is eliminated.

6. In surveying the fitness of roofs, it is very important to note the condition of metal flashings, skylight installations, drains and other items which affect the efficiency of a roof installation. Proper repairs may include carpentry, sheet metal work and painting as part of the roofing program and the planned cost for maintaining roofs.

7. The maintenance program should include at least a monthly inspection at each site, preferably by the custodian or some other responsible individual, to make sure that roofs are clean and that debris or other foreign materials are not lodged in gutters, downspouts and scuppers.

The plans and records outlined above can be used advantageously for several purposes. They can be used in all conversational and written dealings within the local organization or with contractors to identify areas under discussion. After two or three years of annual inspection and continual correction of the records, the extent of the annual inspection can be reduced to eliminate those roofs which are in satisfactory condition.

How the Work May Be Done

Most roofing programs eventually involve the problem of selecting those who are to do the work and choosing the kind of roofs to be applied. The work may be done by maintenance employees of the district; it may be awarded to contractors as separate items with specifications prepared for each item; or the work may be awarded on a material and labor basis, covering an unspecified amount of work if the exact materials and types of applications are included in the contract and covered by a specific bid.

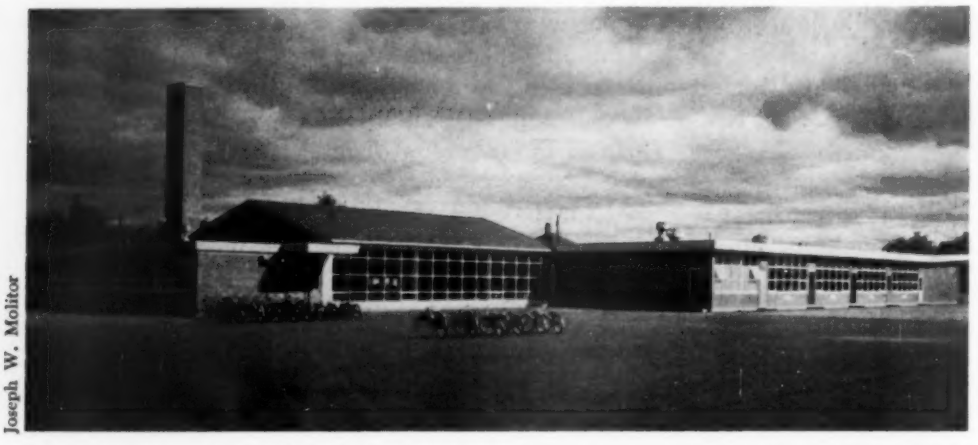
Insofar as types of roofs to be used are concerned, there are many reliable roofing material manufacturers whose products will give good performance if properly applied. Their representatives and roofing contractors will, in most cases, make honest recommendations on the type of roofing materials best suited for a particular roof and for a particular locality.

As pointed out above, the type of roofing is often dictated by the quality of the building being repaired.

If a short life roof is desired, the very minimum of materials with a lightweight cap sheet is all that is necessary. If longer or indefinite durability is desired, there are many high quality types of roofing available for different types of buildings.

For flat roofs an application of gravel with four or five sheets and asphalt underneath may be considered a good type of roofing.

A long life roof for areas with steep slopes can be obtained by using some combination of roofing felts, asphalt and asbestos cap sheets. In some instances, the installation may justify the purchase of a bonded roof; an example is the roof which involves the use of coal tar pitch rather than asphalt. This material is becoming available in the West and, without any question, lengthy service can be obtained from these roofs and may well be justified.



Joseph W. Molitor

Whether for steeply sloped or flat roofs there is a type of roofing material which will best meet the needs of a school building. Shown here is the Skowhegan Elementary School, Skowhegan, Maine. Alonzo J. Harriman, Inc., architect.

Choosing the Type of Roof

Choosing the type of roof to be used on any school site should receive the careful consideration of those who are responsible for the roofing maintenance program. There are factors of weather, vandalism, appearance, anticipated life of the building and structural problems which may be deciding points in selecting the type of roof to be used.

Equally important is the method of application. The anticipated life for any type of roof depends, to a great extent, on the care with which the installation is made. Here again, the major manufacturers of roofing materials will provide detailed specifications and drawings showing the recommended installation for the types of materials they sell. Certainly, in most cases, these recommendations are reliable since the manufacturer is interested in demonstrating the quality of his materials and producing further sales.

There are often peculiar structural conditions or other factors which may dictate the kind of installation for a site. If the work is performed by a contractor, careful inspection is certainly necessary during the progress of the work. In this way the owner will assure himself that it is installed according to specifications.

The way in which work is done around flashings, drains, roof edges, etc., will often mean the difference between many years of satisfactory service or a roof that leaks continually throughout its entire use.

Another important item of supervision is the method of application. Generally speaking, roofing felt should be rolled on rather than laid on in sheets. This procedure insures a uniform application of the hot asphalt and prevents the trapping of air or gas underneath the layer of felt. Careful inspection should be maintained of the temperature of the asphalt applied to the roof. There is a tendency to overheat asphalt, causing it to lose some of its volatile materials. This renders the asphalt brittle after being applied, and asphalt at high temperatures has so low a viscosity that roof applicators cannot apply the pounds required in most specifications. The recommended temperature for most asphalt applications is a maximum of 425 degrees at the kettle and not to exceed 350 to 375 degrees on the roof.

Proper installation of flashings and the installation of the roof and firewalls also require close supervision when new roofs are applied. If possible, the program should be organized so that most of the inspection of work in progress and the annual inspection thereafter can be handled by the same personnel. The individual or individuals assigned to this work then become acquainted with roof conditions and have first-hand knowledge of the problems at different sites.

Who Will Do the Work?

The number of buildings and the total of roofs to maintain will affect the decision concerning who will do the work. Most experience favors the use of an outside contractor on a time and material basis with the contract awarded annually. The reasons for this are:

1. Reliable contractors usually maintain operating crews of trained men at all times. These can perform the routine maintenance tasks and are available for emergency repairs.
2. The quantity of work needed in most districts will

not justify having a trained roofing crew on the payroll.

3. Because of the desirability of having most of the work done during the summer months, it is usually possible to get more accomplished through a reliable contractor than it would be with the smaller crews that a school maintenance department would maintain.

4. A time and material basis is better than having exact specifications for each site, since it is sometimes impossible to determine the extent of some repair jobs until the old roof is removed or until steps have been taken toward accomplishment of the work.

5. When the entire contract is awarded to one contractor for a year, the scheduling of repairs can be worked out to a better advantage than if jobs were contracted separately.

When large roofing areas have been neglected and maintained purely on a patch basis over a period of years, there will be an enormous increase in the cost of maintaining the roofs when a repair program is set up. Within two or three years, however, this can be expected to drop down to a figure which will be close to an average annual cost.

Determining Average Costs

A reasonably accurate tabulation of all cost figures should be maintained regardless of the fact that roofs of different types and quality may be installed on various buildings. If the cost of reroofing and all the accompanying repairs are included in this tabulation, the annual cost per square foot can be determined. After a period of two or three years, if job planning is properly done, the reroofing should be scheduled approximately to equal, on an annual basis, the average cost per square foot for the entire area being serviced.

KEEPING CHALKBOARD SURFACES IN TOP CONDITION

by GEORGE H. LADD

Maintenance Engineer, San Diego, California, Unified School District

CHALKBOARD consists of an abrasive surface on which chalk characters can be made with solid, unbroken, sharply contrasted lines. This surface should erase with little effort, remaining relatively clean. The variety of materials and colors available in chalkboards affects not only their direct use but the appearance and lighting of classrooms. However, the decision concerning which type of board to use is primarily an instructional decision and this report concerns general rules for the proper care and usage of the commercial products available.

There are three types of materials now used for chalkboards:

1. Slate
2. Glass, available in a variety of colors
3. Composition boards, available in a variety of colors and materials. Most of these boards consist of a layer of abrasive surface in the color desired, which has been applied to some type of a composition sheet, either fibreboard or mineral.

There are certain general rules which apply to any and all types of chalkboards:

1. All boards should be cleaned DRY, using a clean chalkboard eraser supplemented with a soft cloth or chamois skin if necessary. Washing with water should be avoided at all times. The use of water usually results in a streaked appearance, and often causes trouble with the surfaces used on some composition boards. In any instance, water will combine with the binding agent in chalk causing it to adhere to the board. Repeated usage of water will cause an accumulation of rough, scaly material on the board.

2. Oily cleaning fluid should never be used on a board. The chalkboard is primarily an abrasive surface

Chalkboards will give long wear if properly maintained.



Hedrich-Blessing

and the use of oil reduces this action and fills the pores of the board creating slick surfaces which are undesirable.

3. Most chalkboard manufacturers recommend a breaking-in process before the board is used. This process reduces glare and insures a uniform application of chalk before usage is started so that an even viewing surface is available thereafter. The process consists simply of cleaning the board thoroughly in the first place and coating with a heavy application of chalk, using the long side of soft chalk. After the chalk is applied, it is rubbed into the chalkboard with an eraser, making sure that the entire surface is thoroughly covered. Then surplus chalk is removed with clean erasers and cloth.

Slate Boards

Over a period of years slate boards become worn, hard spots show up and scratches may have developed from misuse. The surface of slate boards can be reground very satisfactorily without removing the slate from the wall. Different compounds are available for this job. There is a grinding kit on the market which includes specific instructions for grinding slate boards by hand with the use of grinding blocks which are provided in varying degrees of coarseness.

The cost for this operation depends on the condition of the boards being refinished. The average cost for refinishing old chalkboards in poor condition is about 18 cents per square foot. As yet there is no equipment available for mechanizing this operation.

Glass Chalkboards

Glass chalkboards seem to be subject to very little damage or deterioration from any type of mistreatment. They are, of course, subject to breakage and a complete replacement must then be made.

Composition Boards

There are many materials available among the different kinds of composition chalkboards. A life expectancy of from ten to fifteen years under normal usage can be expected from the best quality boards. Prohibiting the use of oil and water on these boards is particularly important in their maintenance. On problems involving scratches or marred surfaces, the manufacturer should be contacted for advice. The manufacturers of some composition boards provide patching materials and instructions for their use.

When composition boards become physically worn to the point where they no longer serve their original purpose, they usually will have to be replaced. There are surfacing materials sold by both chalkboard manufacturers and paint companies which can be used for resurfacing. These paints or surfacing materials can also be used very satisfactorily by school maintenance departments in making odd-sized portable chalkboards or installing chalkboards of a temporary nature. However, these materials cannot be expected to achieve the same results as manufactured composition boards.

The following procedure will produce a board which will perform very satisfactorily for two or three years:

1. Shellac a sheet of masonite using one heavy coat.
2. Sand lightly and spray on two coats of slating material. (The slating materials or paints are manufactured by several companies.)
3. When spraying on the slating material, the board should be placed in a horizontal position. This permits the application of a heavier coat.
4. Later, if the board ever requires resurfacing, the slating material can be brushed on while the board is in a vertical position. Brush coats, however, are not heavy enough to produce satisfactory results for any long period of time.

Some manufacturers furnish labels to be placed on their boards giving the custodians certain definite "do's and don't's" for the care of their chalkboards. If these are not available, it is recommended that decals or labels be prepared incorporating these rules, to be placed on the board so that anyone who is assigned the duty of cleaning and caring for the boards will be aware of the rules he should follow.

MAINTENANCE OF SCHOOL BUSES IN CADDO PARISH

by C. L. PERRY

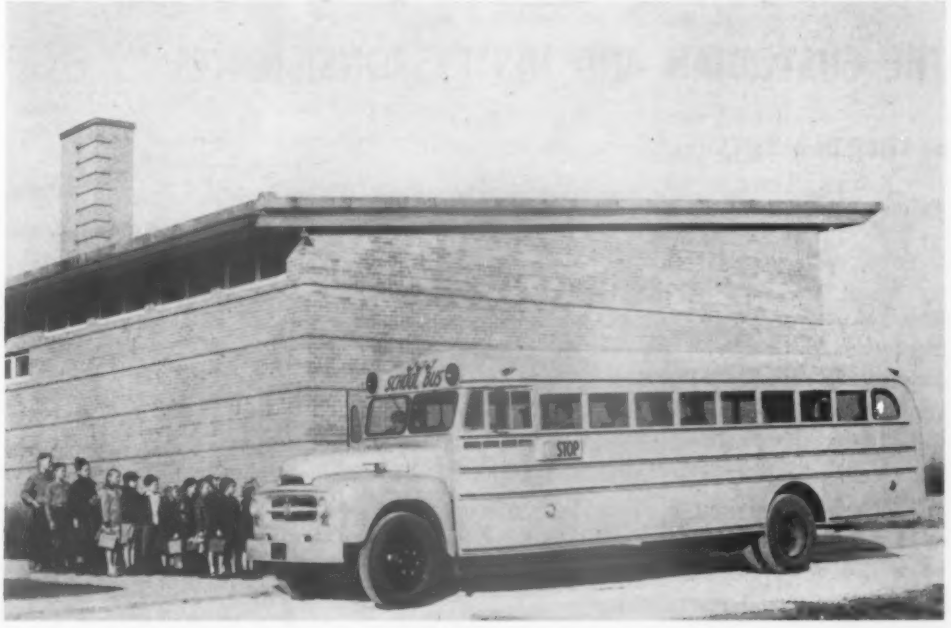
Assistant Superintendent, Caddo Parish School Board, Shreveport, Louisiana

CADDO Parish, Louisiana, includes the city of Shreveport, a long narrow rural area north of the city and a large and broader area south of the city. In early years of pupil transportation in this Parish buses were owned privately, but by 1941 the School Board had completed a program of assuming ownership of all buses that operate to public schools. Caddo Parish now owns 128 buses, most of which are of 54-passenger

capacity. The fleet has been increased by 18 buses this summer because of school population growth and a program of school consolidation. The Board expects to add 70 to 80 additional buses over the next two years when the expected continued growth and consolidation of 74 rural negro schools into six consolidated centers materialize. All the children in the northern part of the Parish attend their community schools except the negro high school students who are transported to the Booker T. Washington High School in the city of Shreveport. There never has been a high school for negro students in the rural area of the Parish. Most of the children in the rural area south of the city of Shreveport are transported into the city.

Maintenance of school buses in the Parish is carried on in two centers, each of which has a head mechanic in charge who is directly responsible to the transportation supervisor. One maintenance center is located at Vivian and takes care of approximately 35 buses. The other center is located in Shreveport and services and maintains the rest of the buses. The Shreveport center is operated during the daytime by a head mechanic, two regular mechanics, one gas truck service man, who also works as a mechanic during the summer months, and three helpers. A night crew works from two o'clock in the afternoon until ten-thirty at night and is composed of one mechanic foreman, one regular mechanic and one helper, all responsible to the head mechanic. The night crew becomes a part of the day crew during the summer months. The Vivian center is operated by one head mechanic, one regular mechanic who also operates the gas and service truck, and one helper.

International Harvester Company



School buses should be in perfect mechanical condition at all times. Periodic check-ups and speedy repairs contribute to a successful school transportation program.

Checkup Procedures

Negro students are employed to drive the buses which come into the negro high school, and make one round trip a day. All other drivers in the Parish are permitted to go home in their buses after making their runs, which means that they make two round trips per day. The drivers of the buses are required to sweep them out and keep them generally clean but do not have to wash them. They must report to their center any mechanical defect which is observed by them in their bus at any time. They also are required to check their buses each morning, thirty minutes to one hour before beginning their route, according to the length of the route.

If a driver finds that his bus will not start or if he has trouble enroute, he notifies his center by telephone as quickly as possible. The mechanic receiving the trouble call from a driver endeavors to determine whether or not an extra bus needs to be sent out and the regular bus brought in, or whether only a minor adjustment must be made. Each of the centers has a number of service pickup trucks properly equipped for making trouble calls. On one morning during the last school year, when freak weather conditions prevailed, the Shreveport center received twenty-eight trouble calls, mostly buses that would not start. The calls were answered in such a manner that only one of the buses was reported late for school.

The gas truck service man at each maintenance center goes on regular schedule to the various schools one or more times a week, as required according to length of routes. He services each bus with gas, oil, air and makes a routine check of the mechanical operation of the bus, especially where safety of operation is involved. When the gas truck service man finds a bus that should go to the center for some particular repair, he requests the driver to report with the bus to the center. He reports to the head mechanic that he has referred

the bus to the center for whatever the repair. In addition, each driver periodically reports to the center for washing, greasing, oil change and a complete checkup.

Records and Reports

Records are kept in each of the centers of what has been done on each bus. The head mechanic keeps a parts wanted list and the supervisor of transportation periodically receives informal bids on the necessary quantity of parts to bring the inventory up to requirements. Job sheets are prepared by the head mechanic and submitted to the supervisor, who in turn delivers them to the chief accountant for routine accounting procedures. All purchase orders, except emergency requirements, are signed and issued by the business manager, and invoices are not paid until properly receipted by the person receiving the purchases at the center.

During the summer months every bus is completely worked over, including painting and upholstery work. All buses are inspected by the transportation supervisor and by city and state police before being returned to drivers at the beginning of a school year.

The Vivian center uses approximately 10,000 gallons of gasoline every two and one-half months. The Shreveport center uses 15,000 gallons every three to four weeks. (Approximately thirty maintenance trucks and business cars are serviced at this center also.) All gasoline is bought on bids and competition is keen.

Presently the School Board has no place to store buses under cover during the summer months; however, a service center is being constructed at a cost of $450,000. It will include housing for all school materials and supplies, maintenance warehouse and shop facilities, cafeteria food and equipment storage, and transportation-maintenance facilities, including covered storage for 250 transportation units.

THE CUSTODIAN AND HIS RESPONSIBILITIES

by KENNETH A. ESTES

Assistant Superintendent of Schools, Owensboro, Kentucky

THE school custodian is no longer a person who has grown too old for any other type work and merely marks time with a broom in his hand. He is a cooperative member of a busy school program who knows where his responsibilities start and where they stop, but he is always willing to go over and beyond these responsibilities when needed.

Proper scheduling of time is necessary for the efficiency of school plant operation. None of the Owensboro, Kentucky, custodians finds it necessary to work longer than eight hours per day even though some of the schools are open from 7 A.M. until 10 P.M. every day and frequently later. In buildings large enough for two or more custodians the work days are staggered so that a member of the staff is present during the intervening time. Maids in all the schools come to work at 2 P.M. and work until 5 and 7 P.M.

Each individual has his responsibilities earmarked. It is what he sees to do beyond specific responsibility to improve the physical appearance or general operation of the building that makes the difference between a time watcher and a true custodian. Too strict a schedule has a tendency to destroy individual initiative, so time must be provided during the day for additional tasks which may turn up.

Al Salter

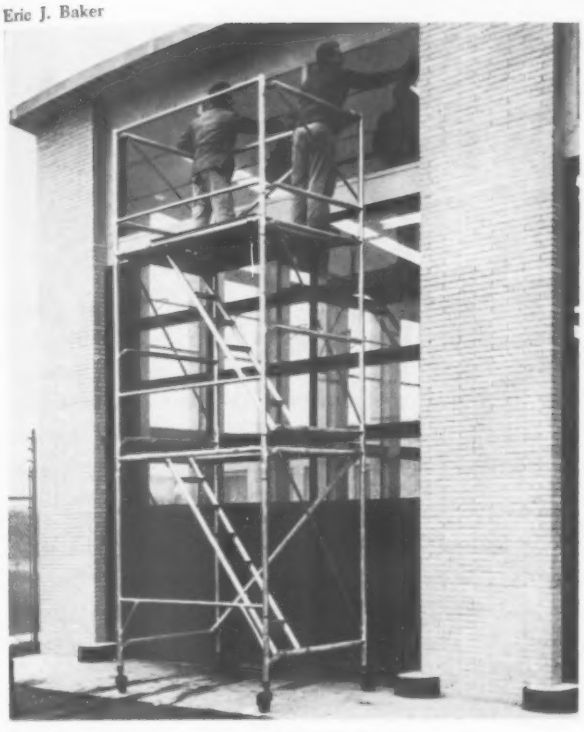


The school custodian has a busy schedule of repairs and inspections throughout the school building.

General Work Schedule

The following general schedule is used by the principal and head custodian in Owensboro to determine the specific responsibilities of each worker in the various schools:

Eric J. Baker



The outside windows are usually washed during the summer or Christmas holidays.

First Shift Janitors, Daily Duties

1. *Care of heating, ventilating and mechanical apparatus*
   a. Clean grates and ashpit
   b. Start fires in the morning
   c. Replenish fires as needed
   d. Inspect thermometer, and steam and water gauges as needed
   e. Inspect pumps and drains
   f. Turn off lights not needed
   g. Start and stop pumps
   h. Janitors at small schools see that furnace is safe for the night before leaving in the afternoon
2. *Miscellaneous daily tasks*
   a. Unlock doors at specified time set by principal
   b. Burn waste paper
   c. Provide chalk and other needed supplies in the rooms
   d. Remove marks on walls and walks
   e. Check supplies in toilet rooms
   f. Pick up paper and trash from grounds
   g. Clean locker rooms
   h. Clean boiler and engine rooms
   i. Sweep walks near the doors
   j. Inspect and clean water fountains and lavatories
   k. Clean rooms assigned

Second Shift Janitors and Maids, Daily Duties

1. *Cleaning and sweeping*
   a. Mop toilet room floors
   b. Clean urinals and stools
   c. Sweep (or clean) each classroom and office
   d. Sweep corridors and stairs
   e. Dust classroom and office desks, tables, chairs, window sills, cases, shelves and doors
2. *Miscellaneous daily duties*
   a. Bank fires for the night
   b. Lock all outside doors and windows
   c. Turn out all lights

Saturday Morning Duties—All Janitors

1. Dust radiators
2. Blow down boiler and clean boiler flues
3. Clean walks around the yard
4. Clean chalkboards as often as desired in each building
5. Clean and mop the lunch room
6. Clean floor brushes, mops, dust brushes and other tools
7. Inspect buildings for fire hazards
8. Inspect all motors, pumps and engines to see that they are properly oiled
9. Mop untreated floors
10. Clean floor mats
11. Wash or wipe doorknobs and handrails
12. Inspect playground apparatus for broken parts

Bi-weekly or Monthly Duties

1. Clean tile walls
2. Dust pictures
3. Wash windows on the inside
4. Polish brass and other polished metal surfaces

These duties should be so arranged that a half hour or more, if needed, can be devoted to these tasks each day in order that a complete round of the building will be made by a specified time each month.

Tasks To Be Done As Need Arises

1. Wash windows outside during summer vacation and at Christmas
2. Make an inventory of supplies once each year
3. Renew floor finishes as needed
4. Touch up spots on waxed floors as needed
5. Clean and polish furniture and woodwork during summer vacation
6. Scrub and wax all floors during summer vacation period

Time Schedule Is Set Up

After this schedule has been revised to fit the individual school, specific hours are set for the various responsibilities to be fulfilled. For instance, fires are to be started at different times according to the type of building to be heated. One school can be heated within 45 minutes which permits that fireman to come at 7 A.M. Another school needs two hours before the building is warm enough for occupancy, making it necessary for that fireman to start at 5:30 A.M.

USE OF A BUILDING SURVEY IN PLANNING THE MAINTENANCE BUDGET

by HERMAN F. BECKLEY

Director, Buildings and Grounds, School City of Muncie, Indiana

THE use of a building survey as a means of planning the maintenance budget for the Muncie, Indiana, schools has aided us greatly in preparing an accurate, clearly defined and sound budget for the maintenance of our buildings and grounds.

In this day of ever increasing school enrollments, rising material and labor costs, new building construction and the added emphasis on providing a better classroom environment, we are continually faced with the problems of stretching the tax dollar and at the same time keeping the total tax burden from climbing ever higher. All items in our budgets must be clearly justified. All guesswork and looseness must be eliminated from planning.

The use of the building survey has given us a factual basis for determining our maintenance budget. There are numerous ways in which a building maintenance survey can be conducted. Our survey is made each year, usually during the month of April. Many persons enter into the final planning of our maintenance needs. The actual survey of the buildings and sites is carried on by the director of buildings and grounds and his maintenance foreman. However, the principal of the school, the teachers, custodians and maintenance employees are all encouraged to submit any information or requests for needed maintenance that has come to their attention during the year. This information is carefully checked and, if a definite need is found, it is included in the survey information.

Sometimes, for the purpose of consultation, many of the technically trained people in our community are called upon to offer recommendations. The analysis of the maintenance needs of a school plant requires a wide, practical knowledge of school building construction, and the person making the survey must be well qualified in that field.

Conducting the Survey

In conducting the survey, each building in the school system is visited and all parts of the building and grounds, as listed in the following outline, are carefully checked. A complete listing of the maintenance requirements is made and the cost of each request is estimated. From this list items are given priority ratings, so that the most urgent needs can be taken care of first.

As it is impossible to include every need in the present budget many items must be set up for inclusion in future budgets. The information of the survey is accumulative, and any needs which cannot be taken care of during the budget period in which they are listed, may be carried over into the next budget period. The parts of the buildings and grounds which are surveyed are as follows:

1. *Roofs:* roofing, valleys, flashing, gutters and downspouts, skylights, room ventilators, chimneys, etc.
2. *Exterior walls:* cap stone, parapet walls, exterior walls, windows, entrance doorways.
3. *Building interiors:* floors, walls, ceilings, windows, doors, chalkboards, bulletin boards, built-in cabinets, stairs, ramps, lockers and wardrobes, fire equipment service, window blinds.
4. *Hardware:* door locks, hinges, door closers, panic hardware, sash hardware, cabinet hardware, lock system, door bumpers and hold-open devices.
5. *Glass:* window glass, door glass, display cases, skylights, mirrors, etc.
6. *Painting:* exterior painting, interior painting, special painting.
7. *Electrical:* entrance service, lighting circuits, power circuits, electrical lighting fixtures, clocks, public address systems, fire alarms, electrical motors, etc.
8. *Plumbing:* sanitary and storm sewers, water supply, waste and drainage lines, plumbing fixtures, sprinkler systems, sump pumps.
9. *Heating:* furnaces, boilers, stokers, hot water heaters and storage tanks, condensate pumps, circulating pumps, steam pipes and returns, radiators, traps, temperature control systems, hot air ducts and registers, foul air stacks, chimneys and conveyors, oil storage tanks, unit ventilators, water treatment, safety water feeders and cut outs.
10. *Ventilating:* fresh air intake fan and dampers, air ducts, roof ventilators, air exhaust systems, air intake filters, unit ventilators, etc.
11. *Grounds:* grading and filling of grounds, lawns, trees, shrubs, walks, steps, driveways, retaining walls, paved playgrounds, playground equipment, fences, athletic fields, etc.
12. *Equipment and tools:* care and replacement of hand tools, small equipment, maintenance of tracks, tractors and general maintenance equipment.

TEN YEARS OF SCHOOL BUS TRANSPORTATION

by KARL T. HEREFORD

Associate Editor, American School and University

WITH a rise in the past decade of nearly 120 percent in the number of public school children transported daily, school bus transportation has become big business. For many school administrators, it has also become a big headache. In 1954, an estimated 350 million tax dollars were spent to transport a third of the nation's school children. By 1960, enrollment increases and district enlargements will likely push this expenditure for transporting school children to the half-billion dollar mark.

Like it or not, the school administrator is in the transportation business. How well he discharges this added chore depends a great deal on his ability to use the accredited experience of others. Indeed, this is just about all he has to go on. His professional preparation falls far short of equipping him to plan and act wisely in this field.

Trends and Developments

As an aid to administrators, we have attempted to bring together the significant trends and developments reported by transportation authorities since World War II. These developments have been identified in a round-up of the fifteen articles on pupil transportation which have appeared in the last ten volumes of the AMERICAN SCHOOL AND UNIVERSITY. The accompanying tables and photographs summarize these highlights of ten years of school bus transportation.

Central Michigan College of Education



1

More pupils are transported daily to and from school than ever before in the United States.

Pupils in the Traverse City School System, Michigan, are among the 9,600,000 elementary and secondary children in the public schools now being transported to school at public expense.

Number of Public Elementary and Secondary Pupils Transported at Public Expense

	1943-44	1949-50	1954-55
No. Pupils	4,410,362	6,980,889	9,600,000
Approximate % Increase Over 1944	—	58%	118%



In the 1943-44 school year there were 91,927 school buses in use. By 1949-50 the number had increased to 115,202 (with 102,202 of this number having a capacity of 12 or more passengers); and in the 1954-55 school year there were 153,000 school buses in operation (133,000 seating 12 or more passengers).

2

More and bigger buses are used to transport students to and from school daily.

Number and Size of School Buses In Use 1943-1955

	1943-44	1949-50	1954-55
Total Number of Vehicles	91,927	115,202	153,000
Number of Buses Seating 12 or More Passengers	—*	102,202	133,000

*Information is not available.

Central Michigan College of Education



3

More money is spent.

- Public funds for pupil transportation has trebled in the last ten years.
- The relative cost of pupil transportation has remained at or near 5 percent of total expenditures.
- Unit costs of operation have steadily declined.

Costs of School Bus Transportation 1943-1955

	1943-44	1949-50	1954-55
Total Expenditure	$107,754,467	$204,611,283	$348,000,000
Percent of Total Current Expenditure	4.7%*	4.4%*	5%*

*Rough approximation.



4

Public ownership of buses is advantageous.

- By every measure, publicly owned and operated transportation programs prove more efficient, safe, convenient and economical. (a, i, n)*

Number of School Buses Public vs. Private Ownership

	1943-45	1949-50	1954-55
Total Number of Buses	91,927	115,202	153,000
Total Privately Owned	—**	43,202	63,000
Total Publicly Owned	—**	72,000	90,000

**Information is not available.

* Letters refer to fifteen AMERICAN SCHOOL AND UNIVERSITY articles from which these trends and developments were taken. See bibliography at end.



Centrally located school bus garages are being operated by more and more school systems. Preventive maintenance programs are observed with repairs being made by full time maintenance crews.

5

Preventive maintenance programs are increasing.

- With public ownership and operation has come increasing attention to and provisions for preventive maintenance programs. (c, e, f)
- Centrally located bus garages with full time maintenance crews are increasing in number.
- Periodic inspections by state and local transportation authorities help keep maintenance costs down, safety and efficiency up.



Central Michigan College of Education

Michigan State College school bus driver training consultants meet in the schools with groups of drivers. The training program includes many tests and measurements of the skills and competencies of the trainees.

Michigan State College



6

More and better (?) driver training.

- Recruiting and training an adequate corps of part-time bus drivers persists as the chief problem facing the school administrator. Students, housewives and staff members are usual driver sources. (g, h, i)
- Classroom and highway testing and training programs are appearing increasingly at both state and local levels. These range widely in both scope and adequacy.
- Physical examinations are required in many states.
- Training programs aim at preparing drivers who are in top physical condition and of exemplary character to
  - (1) handle the vehicle satisfactorily under varied conditions
  - (2) exercise mature judgment, and
  - (3) deal well with children.





7

Body and equipment tend toward a uniform vehicle.

- About 90 per cent of the transported pupils now ride in vehicles that meet fairly adequate construction standards. (d, o)
- State bus standards are approaching a uniform vehicle.
- Some 44 states have bus codes in law or departmental regulations covering these standards. Four states recommend standards. Enforcement is fairly effective.

8

Traffic codes are moving toward uniformity.

- All states have some law relating to passing a school bus. (k, n, o)
- 44 states require traffic to stop in both directions upon approaching a bus which is stopped.
- Enough variability still exists among the various traffic codes to warrant a re-appraisal of the "model" code advocated by the National Conference on Pupil Transportation.



Central Michigan College of Education



9

Greater use of buses is made for instructional purposes.

- The National Conference on Pupil Transportation members report an increase in use of buses for educational trips. (g, o)
- Some states prohibit such use, while others share in the cost of operation for instructional purposes.
- A compelling need for criteria or principles upon which programs of instructional use of buses may be based is shaping up.

10

Purchasing practices influence the cost of buses.

- Business methods applied to pupil transportation cut cost. (a, h, i)
- State purchasing machinery is being used in some states to reduce local district costs through mass purchasing.
- Separate body and chassis bid invitations, based on specifications approved by the state board or department of education and submitted directly to manufacturers rather than to local dealers, tend to reduce cost.
- Purchases timed for year-round delivery allow manufacturers to produce at less cost to the local district.





Education Center—San Diego City Schools

11

Uniform accounting measures and procedures are developing.

- The 1948 National Conference on Pupil Transportation recommended and publicized a system of records and reports for pupil transportation. (n)
- Since that time several states have reviewed their accounting practices and have incorporated changes.
- Developments in uniform accounting are slow. Statistical research efforts may be more effective as uniform data become available.



12

The insurance picture is confused. (h, k, n)

- One authority observes that an increasing number of local districts carry accident and/or liability insurance.
- A very few states have studied the whole problem of liability as it affects all phases of school life, as well as pupil transportation.
- Until such state-wide studies and programs materialize further developments in insurance coverage will continue to be confused.

American School and University Articles on School Transportation

	Date	*Volume*	*Title*	*Author*	*Page*
a	1945	XVII	Purchase, Care and Use of School Buses	A. R. Meadows	532
b	1945	XVII	Lengthening the Life of School Buses	E. Glenn Featherston	536
c	1945	XVII	A Maintenance Program for School Buses	B. H. Belknap	540
d	1946	XVIII	School Bus Standards	E. Glenn Featherston	243
e	1947	XIX	School Bus Garages	E. Glenn Featherston	146
f	1948	XX	Planning the School Bus Shop	A. R. Meadows	263
g	1948	XX	Students Take the Wheel in North Carolina	Clyde A. Erwin & Associates	260
h	1949	XXI	Pupil Transportation Is Improving	E. Glenn Featherston	215
i	1949	XXI	A School Bus Driver Training Program	Burton H. Belknap	318
j	1950	XXII	Purchasing School Buses	Robert L. Hopper	398
k	1951	XXIII	Recent Developments in Pupil Transportation	E. Glenn Featherston	368
l	1952	XXIV	Selecting the Supervisor of Transportation	Kermit A. Johnson	413
m	1953	XXV	Defining Limits for Free School Transportation Service	A. C. Lambert	383
n	1953	XXV	School Transportation—A Look Ahead	Dorr Stack	387
o	1954	XXVI	Developments in School Transportation	E. Glenn Featherston	461

SCHOOL PLANT BIBLIOGRAPHY

Selected Sources and References for School Plant Planners

by DALE K. HAYES

Director of Research, American School Publishing Corporation

THIS list of selected articles, pamphlets, books and guides is for use in planning new school buildings. All of the hundreds of available items cannot be included, but a few select references are listed for each of the various phases of planning and construction.

Several guideposts were used for selecting. Everything else being equal, the more recent items were given precedence over older ones. Balance among the various areas of building planning and design and the relative importance of each were carefully considered. Where there were many works about a particular part of the building process, a representative group was selected. This resulted in the omission of some excellent works. The dearth of material concerning various other subjects made it necessary to include all that was available.

In general, works describing the "why" were given precedence over those defining only "what was done." References which seemed to have general application to many localities and communities were emphasized.

TABLE OF CONTENTS

	See Page
Help for Planners	**454-456**
Agencies	454
Bibliographies	454
Books, Current	455
Codes and Standards	455
Conferences	455
Consultants	455
Current Periodicals	456
Guides and Manuals	456
Visits	456
Organizations To Be Housed	**456-459**
Nursery and Primary Schools	456
Elementary Schools	457
Secondary Schools	457
Community Schools	457
Rural Schools	458
Junior Colleges	458
Colleges and Universities	458
Dormitories	458
Food Service	459
Planning	459
Student Unions	459
Other Buildings	459
Special Schools	459
Building—Spaces	**460-464**
Arts and Crafts	460
Auditoriums and Stages	460
Bus Garages	460
Classrooms	460
Corridors	461
Custodians' Suite	461
Gymnasiums	461
Health Service Suite	462
Homemaking	462
Libraries	462
Lunchrooms	462
Music	463
Offices	463
Science	463
Shops—General	463
Storage	464
Teachers' Rooms	464
Vocational Training	464
Building—Technical and General Aspects	**465-467**
Acoustical Control	465
Adaptability	465
Audio-Visual	465
Central Sound Systems	465
Color	465
Equipment	466
Heating and Ventilating	466
Lighting-Daylight	466
Lighting—Electric	467
Plumbing	467
Safety	467
Structural Materials and Design	467

See Page

Buildings in Other Countries 468

Grounds 468-469
- Camping 468
- Landscaping 468
- Playgrounds 468
- Site Selection 468
- Winter Sports 469

Planning 469-471
- The Architect 469
- The Board and Superintendent 469
- Coordination with Civic Planning 469
- Finance 470
- Procedures 470

Trends in Program and Design 471

Remodeling Old Buildings 471

Published Research 471-472

HELP FOR PLANNERS

Agencies

Help on special problems may be available at some of the following agencies:

American Institute of Architects

The Octagon, 1735 New York Avenue, N.W., Washington 6, D. C.

The national organization of the architectural profession. Publishes the Journal of the American Institute of Architects and a bi-monthly research bulletin.

Association of School Business Officials

306 East Lovel Street, Kalamazoo, Michigan

Their most valuable school plant publications are found in the Annual Convention Reports.

Illuminating Engineering Society

1860 Broadway, New York, New York

Studies and reports on efficient artificial lighting methods.

Interstate School Building Service

George Peabody College for Teachers, Nashville 4, Tennessee

Offers consultative services to state, county and local school units. Issues some free pamphlets dealing with specific plant problems.

National Board of Fire Underwriters

85 John Street, New York 38, New York

Publishes several bulletins prescribing regulations for safe building construction.

National Council on Schoolhouse Construction

George Peabody College for Teachers, Nashville 4, Tennessee

The major national organization dealing specifically with problems of school plant planning. The 1953 Guide for Planning School Plants is a major contribution to the field.

National Education Association

1201 Sixteenth Street, N.W., Washington 6, D. C.

The following departments publish material or carry on studies in the plant field:

American Association for Health, Physical Education and Recreation
American Association of School Administrators
American Educational Research Association
Department of Elementary School Principals
National Association of Secondary School Principals
N.E.A. Research Division

National Recreation Association

315 Fourth Avenue, New York 10, New York

Consultative and informational service to school plant planners in the area of recreational use.

New England School Development Council

Spaulding House, 20 Oxford Street, Cambridge 38, Massachusetts

An association of public school systems which publishes pamphlets in this field from time to time.

U. S. Department of Health, Education and Welfare, Office of Education, School Housing Section

Washington 25, D. C.

Organized to promote better school and college plants. Publishes pamphlets, articles and bibliographies, often in School Life, the Office monthly magazine.

State Departments of Education

There are at least 37 which employ one or more plant specialists in the school plant.

Large City School Systems

The largest have staffs; some of the smaller have individuals, whose sole or principal work is in this field.

Colleges and Universities

Many state and non-public institutions are prepared to give consultative service in planning school facilities.

Bibliographies

Appendix A—Selected References

American Association of School Administrators, Commission on American School Buildings. *American School Buildings* 27th Yearbook, p. 325–341. 1949 $4

197 references, both recent and available, selected as applicable to particular topics discussed in the yearbook.

Building Type Reference Guide No. 1: The Public School Building

American Institute of Architects, Department of Education and Research. Bulletin of the American Institute of Architects 1:39–50. March 1947

School Plant and Equipment

By Nelson E. Viles, Chairman; Review of Educational Research 21:1. February 1951 $1. About 359 items.

Latest in recurring cycle of reviews of research.

School Plant Bibliography

American School and University 27. 1955–56 American School Publishing Corp., 470 Fourth Avenue, New York 16, New York. p. 453–472

Also available as a reprint. Some 400 selected references.

Selected References on Public School Administration, School Plant

By D. H. Cooper and N. L. Anderson; Elementary School Journal 50. January 1950 p. 294–296

Also see Educational Index, Cumulative Book Index, Reader's Guide to Periodical Literature, Art Index, Industrial Arts Index, or the cumulative index in volumes of American School and University.

Current Books

American School Buildings (27th Yearbook)

American Association of School Administrators, National Education Association, 1201 16th Street, N.W., Washington, D. C. 1949 252 pp. $4

Committee of school administrators and plant specialists presents facts and recommendations for planning school plants.

Planning Elementary School Buildings

By N. L. Engelhardt, N. L. Engelhardt, Jr., and Stanton Leggett; F. W. Dodge Corporation, New York, New York. 1953 275 pp. $12.50

Comprehensive coverage of what elementary school buildings should be in terms of children.

Planning Secondary School Buildings

By N. L. Engelhardt, N. L. Engelhardt, Jr., and Stanton Leggett; Reinhold Publishing Company, New York. 1949 320 pp. $10

A comprehensive treatment of the problems in planning secondary school buildings.

Planning and Modernizing the School Plant

By Merle A. Stoneman, Knute O. Broady, and Alanson D. Brainard; Lincoln: University of Nebraska Press. 1949 328 pp.

How finance, attendance areas, district organization, curriculum and community needs should be reflected in new school buildings. A useful guide for school administrators and school board members in planning school plants to meet community needs.

School Planning

By Kenneth Reid; An Architectural Record Publication, New York. 1951 456 pp. $8

Articles on school architecture which appeared in the 120 ARCHITECTURAL RECORD issues between 1939 and 1949 are compiled in this book.

Schools

By Lawrence B. Perkins and Walter D. Cocking; Reinhold Publishing Company, New York. 1949 300 pp. $11.50

An architect and an educator present a forward-looking consideration of the problems involved in planning and designing school plants; exceptionally well illustrated.

Toward Better School Design

By William W. Caudill; F. W. Dodge Corporation, New York, New York. 1954 288 pp. $12.75

A summary of research and practice in school design, in which the task of building schools is based upon balance of education, environment and economy.

Codes and Standards

Building Exits Code

National Fire Protection Association, 60 Batterymarch Street, Boston 10, Massachusetts, 12th Edition, 1952 136 pp. $1.00

Standards designed to insure safety. Section 21—Schools.

Fire Prevention Code

National Board of Fire Underwriters, 85 John Street, New York 38, New York. 1953 Edition. 189 pp. Also August, 1954, Amendments. 13 pp.

Recommended standards for safety features of buildings.

National Building Code

National Board of Fire Underwriters, 85 John Street, New York 38, New York. 1949 Edition. 258 pp. Also October, 1954, Amendments, Also Fire Resistance Ratings, January, 1954 48 pp.

An ordinance to promote safe practice in building design and construction. Minimum requirements for specified fire resistance ratings.

Price List of American Standards

By American Standards Association, Inc., 70 East 45th Street, New York 17. Revised Edition 1953 29 pp.

The standards approved by the American Standards Association.

Southern Standard Building Code

Southern Building Code Congress, Brown-Marx Building, Birmingham, Alabama. 1953–54 Revision.

A remedial code designed to promote improvement of building in the South.

Standards for the Evaluation of Elementary School Buildings

By C. W. Odell, University of Illinois, Urbana, Illinois. 1950

Standards for the Evaluation of Secondary School Buildings

By C. W. Odell, University of Illinois, Urbana, Illinois. 1950 75 pp.

Standards and Specifications for Building and Construction Materials, Fixtures, Supplies

Bureau of Standards, U. S. Department of Commerce. 1951 20 pp. Mimeo.

A list of suggested uniform specifications intended to simplify the job of both designer and manufacturer.

Conferences

The national educational organizations, state departments of education, colleges and universities, the American School Publishing Corporation and others sponsor conferences in the field of schoolhouse planning from time to time. Next to attendance at one, careful reading of published summaries is valuable. The man with a problem need not wait for some national conference. He can organize one locally.

Consultants

There are a few men and organizations in the country, principally centered around the larger cities and universities, who are available on full or part-time basis to give counseling to schools facing a building problem. Some are connected with architects' firms; some are active in schools or colleges; a very few are full-time professionals. Nearly all are school men with interest and experience in the planning procedures.

An analysis of the role of the educational consultant is presented in each of the following three articles:

Consultative Services Required in Planning School Buildings

By Cyril G. Sargent and Donald P. Mitchell. AMERICAN SCHOOL AND UNIVERSITY 27. 1955–56 American School Publishing Corporation, 470 Fourth Avenue, New York 16, New York. p. 149–152

Educational Consultants—Their Functions and Work

By Carl F. Guenther. AMERICAN SCHOOL AND UNIVERSITY 26. 1954–55 American School Publishing Corporation, 470 Fourth Avenue, New York 16, New York. 1954. p. 113.

School Plant Consultative Services for the Local School District

By Robert L. Hopper and Donald J. Leu. AMERICAN SCHOOL AND UNIVERSITY 27. 1955–56 p. 153–156

Current Periodicals and Yearbooks

Publications in the fields of both education and architecture devote space to school plant problems. School administration magazines offer both general and technical articles and many reports of new buildings. The needs of special school organizations and departments are discussed in professional journals in the various fields. Monthly magazines in school administration most helpful to those planning school plants include:

American School Board Journal

William C. Bruce, editor, Bruce Publishing Co. 400 North Broadway, Milwaukee 1. $3 yearly. See especially the January, 1954 issue

The Nation's Schools

Arthur H. Rice, editor, The Nation's Schools Division, The Modern Hospital Publishing Co., Inc. 919 North Michigan Avenue, Chicago 11. $3 yearly

The School Executive

Walter D. Cocking, editor, American School Publishing Corporation. 470 Fourth Avenue, New York 16. $4 yearly

Helpful monthly architectural journals include:

Architectural Forum

P. I. Prentice, editor and publisher, Time, Inc. 9 Rockefeller Plaza, New York 20. $6 yearly

Architectural Record

John Knox Shear, editor-in-chief, F. W. Dodge Corporation. 119 West 40 Street, New York 18. $5.50 yearly

Journal of The American Institute of Architects

Henry H. Saylor, editor, The American Institute of Architects. The Octagon, 1735 New York Avenue, N. W., Washington 6, D.C. $3 yearly

The Journal of the Royal Institute of British Architects

66 Portland Place, London W1, England

Progressive Architecture

Thomas H. Creighton, editor, Reinhold Publishing Corporation. 430 Park Avenue, New York 22. $5 yearly See especially the April, 1954 issue.

The yearbook which is unique in its devotion to the field of problems in school and college plant is:

American School and University

Walter D. Cocking, editor, American School Publishing Corporation. 470 Fourth Avenue, New York 16. $7 Published yearly

Guides and Manuals

Citizens Workbook for Evaluating School Buildings

By Jack L. Landes and Merle R. Sumption; William C. Brown Co., Dubuque, Iowa. 1952 $1.50

A handy guide for building committees; suggests practical criteria for evaluating buildings.

Space for Teaching

By William Wayne Caudill; Bulletin of the Agricultural and Mechanical College, Fourth Series, Vol. 12, No. 9. Texas Engineering Experiment Station, College Station, Texas. 1941 124 pp. $1

A not-at-all outdated interpretation of space needs.

Building Manuals for School Systems

By N. L. Engelhardt; AMERICAN SCHOOL AND UNIVERSITY 19. 1947–48 p. 48–51

Defines a manual and its purposes.

A Guide for Planning Elementary School Buildings

By Willis A. Whitehead and others; Bureau of Educational Research, College of Education, Ohio State University, Columbus, Ohio. 1947 130 pp. $2

Proposals for planning school plants and making studies.

State Departments of Education

At least 22 State Departments of Education have guides or manuals currently in print. These states are:

Alabama	Mississippi
Connecticut	Missouri
Delaware	New Hampshire
Illinois	New Jersey
Indiana	New York
Iowa	North Carolina
Louisiana	Ohio
Maine	Oregon
Maryland	Pennsylvania
Michigan	Vermont
Minnesota	West Virginia

Guide for Planning School Plants—1953 edition

National Council on Schoolhouse Construction; Peabody College, Nashville, Tennessee. 1953 179 pp. $2.00

This is a revision of the 1949 edition and is a major contribution to the field.

The Castaldi Nomogram

By Basil Castaldi; New England School Development Council, Cambridge, Massachusetts. December 1953 25 pp. $1.50

A short method of figuring total teaching spaces needed.

Visits

A very valuable help will be visits to selected schools built to meet problems similar to yours. Talk with those who planned, those who designed and built, and those who have used the plant. A careful checklist for program and building features is beneficial.

ORGANIZATIONS TO BE HOUSED

The Nursery and Primary Schools

Housing the Nursery School

Association for Childhood Education; Leaflet No. 2, Portfolio for Nursery School Teachers. Washington, D.C.: the Association. 1945 50¢

Hints by those who work in nursery schools.

Little Schools for Little People

By H. B. Bruner; National Education Association Journal XXXVI, December 1947 p. 630–631

The reasons for and requirements of neighborhood primary schools in Oklahoma City.

The Home Schools of San Francisco

By N. L. Engelhardt, Sr.; AMERICAN SCHOOL AND UNIVERSITY 22. 1950–51 p. 263–264

Plans of home schools provide educational facilities for children geographically isolated from elementary schools.

Bungalow-Schools for El Paso

By C. W. Webb; AMERICAN SCHOOL AND UNIVERSITY 25. 1953–54 p. 267–270

A city finds successful temporary housing for primary children.

Sites, Buildings and Equipment

By John E. Nichols, and others; ch. IX, 46th Yearbook, Part Two "Early Childhood Education"; Chicago: The National Society for the Study of Education, 5835 Kimbark Avenue, Chicago 37. 1947

A complete study of nursery school plant and equipment.

Schools for the Very Young

By Heinrich H. Waechter and Elisabeth Waechter; New York: An Architectural Record Book. 1950 208 pp. $6.50

An up-to-date treatise on the requirements demanded for the proper training of the very young child.

A Classroom for Primary Schools

By Chester Swanson and Fred W. Hosler; AMERICAN SCHOOL BOARD JOURNAL 116:1. January 1948 p. 55–57

Floor plan, four elevations and details of movable cabinets.

Highlander Folk Architecture

PROGRESSIVE ARCHITECTURE, February 1953 p. 104–108 Vol. 34, No. 2

A design experiment at an experimental school.

The Kindergarten: Happy Beginning of School Life

By Frank A. Childs; AMERICAN SCHOOL BOARD JOURNAL 109:4. October 1944

Photos, plans and ideas for attractive kindergarten rooms.

Elementary Schools

Can a Functional School Building Be Beautiful?

By William W. Caudill and Wallie E. Scott, Jr.; THE SCHOOL EXECUTIVE 72:1. September 1952 p. 19–22

Well-written analysis of the truly functional school building; especially good for lay readers.

Project: Planning an Elementary School

By Walter D. Cocking, James H. Bailey, and Archibald B. Shaw; AMERICAN SCHOOL AND UNIVERSITY 21. 1949–50 p. 92–100

A building committee at work.

Elementary School Buildings

NATIONAL ELEMENTARY PRINCIPAL 25:5. April 1946

Suggestions for principals planning elementary schools.

School Buildings and Child Growth

Portfolio by N. L. Engelhardt, Earl M. Towner, John E. Nichols, and W. F. Credle. CHILDHOOD EDUCATION 22. February 1946 p. 282–303

Available as a reprint from the Association for Childhood Education, prepared by competent planners.

Basic Principles in the Educational Planning of Good Elementary Schools

By Millard D. Bell; NATION'S SCHOOLS 47. June 1951 p. 54–58

States general considerations of design in elementary schools.

Elementary School for Hyde Park

By Edwin A. Juckett; THE SCHOOL EXECUTIVE 73:4. December 1953 p. 68–74

Changes in learning and work spaces for children.

Cluster Plan in Darien, Connecticut

ARCHITECTURAL FORUM 99:4 October 1953 p. 128–131

In Darien the cluster plan offers a classic study.

Secondary Schools

The Educational Program in 1963

By Archibald B. Shaw; ARCHITECTURAL RECORD 112. November 1952 p. 119–121

Restates secondary school program in terms of common learnings, specialized training and individual development.

A High School Designed for the Future

By J. Don Garrison; AMERICAN SCHOOL AND UNIVERSITY 27. 1955–56 p. 205–208

Fitting the physical facilities to key considerations which help determine an educational program.

Keokuk, Iowa, High School—Four-Story Classroom Wing

ARCHITECTURAL FORUM 101:4 October 1954 p. 112–119

Combining luxury and economy into the educational program. Plans and photographs of a large new secondary school.

Planning New High Schools

By Stanton Leggett; AMERICAN SCHOOL AND UNIVERSITY 24. 1952–53 p. 219–240

Case histories of four high schools ranging in size from 150 to 2,000.

Planning the Secondary School Plant

By Ray L. Hamon, John H. Herrick, and William G. Eckles. Bulletin of the National Association of Secondary School Principals 32. March 1948 p. 202–227

Educational planning and building guide.

Planning Tomorrow's Secondary Schools

School Planning Laboratory, School of Education, Stanford University, California. 1954 64 pp. $4

Placing emphasis upon the relationship between the educational program and the physical plant.

Secondary Education and Its Buildings

ARCHITECTURAL RECORD 113:3 March 1953 p. 165–189

A forum on planning the secondary school building.

The Secondary School Plant of the Future—A Symposium

AMERICAN SCHOOL AND UNIVERSITY 24. 1952–53 p. 127–142

A look ahead by an architect and several educators.

Solution for New Secondary Schools—The Campus Plan

By Elmer H. Garinger and John E. French; AMERICAN SCHOOL AND UNIVERSITY 27. 1955–56 p. 209–214

Why the campus plan provides one good solution to the problem of meeting the needs of the emerging programs.

Trends in Educational Spaces in Junior High Schools

By Stanton Leggett; AMERICAN SCHOOL AND UNIVERSITY 26. 1954–55 p. 219

Junior high schools should be planned for junior high school students.

Community Schools

Changing Educational Goals—For Both Students and Adults

PROGRESSIVE ARCHITECTURE 35:4. April 1954 p. 110–117

Organization of several units around a central courtyard.

Planning the Community School

By N. L. Engelhardt and N. L. Engelhardt, Jr.; New York: American Book Company. 1940 188 pp.

Out-of-print, but available in libraries, this shows how plant and program of the school can serve community needs.

Planning the Rural School as a Community Center

By Don L. Essex; AMERICAN SCHOOL BOARD JOURNAL 110:5. May 1945 p. 47-48

Location, heating, storage and plumbing facilities as factors in helping the school plant serve the community.

The School as a Community Center

By Robert E. Alexander; THE SCHOOL EXECUTIVE 72. November 1952 p. 62–63

Brief examination of schools from the city planning point of view.

Schools and Community Improvement

Special Reference Issue; THE SCHOOL EXECUTIVE 72. January 1953

Presents the findings from some 440 case histories involving the school and the community.

The School Plant as a Community Recreational Center

By George D. Butler; AMERICAN SCHOOL AND UNIVERSITY 23. 1951–52 p. 151–156

Use of school facilities solves problems for all types of community organizations.

Rural Schools

Better Rural School Buildings

By H. W. Schmidt; AMERICAN SCHOOL AND UNIVERSITY 12. 1940 p. 36–42

Even a one-teacher school can be planned to meet local needs.

Elementary School—Community Center

PROGRESSIVE ARCHITECTURE 35:12. December 1954 p. 120–125

A rural school designed for joint community activities.

Planning Rural Community School Buildings

By Frank W. Cyr and Henry H. Linn; New York: Bureau of Publications, Teachers College, Columbia University. 1949 162 pp. $3.75

This volume presents the combined thinking of a large group of educators, laymen and architects on planning a building for a small community.

Planning School Buildings for Rural Communities

By John E. Marshall; AMERICAN SCHOOL BOARD JOURNAL 114:1. January 1947 p. 64

Stresses importance of starting early and planning thoroughly.

Planning Small Twelve-Grade School Buildings for Multiple Service

By Knute O. Broady and Merle Stoneman; AMERICAN SCHOOL AND UNIVERSITY 12. 1940 p. 51–53

Solutions for special problems presented by the small school.

The Rural Elementary School

By E. Everett Post; THE SCHOOL EXECUTIVE 68:4. December 1948 p. 31–33

Notes from an architect's notebook—stressing expansibility.

Small Schools

By Ralph W. Cherry; THE SCHOOL EXECUTIVE 68:5. January 1949 p. 40–41

Illustration of a rural and a neighborhood school.

Junior Colleges

The Junior College Building and Its Equipment

By W. W. Carpenter; AMERICAN SCHOOL AND UNIVERSITY 9. 1937 p. 39–45

Lists junior college activities needing special facilities.

Planning Contra Costa Junior College

By Drummond J. McCunn, John Carl Warnecke, Frederick L. R. Confer, and Lawrence Livingston, Jr.; AMERICAN SCHOOL AND UNIVERSITY 24. 1952–53 p. 241–254

A case history covering the development of a modern junior college from the ground up.

Study of Junior College Building Needs in California

By Dow Patterson; AMERICAN SCHOOL AND UNIVERSITY 20. 1948–49 p. 157–160

A California Junior College Association Committee sets out to formulate standards for junior college plants.

Planning Community Colleges—A Symposium

THE SCHOOL EXECUTIVE 69:4. December 1949 p. 47–58

Discussion of plans, facilities and reasons for the colleges.

Colleges and Universities

Dormitories

College Dormitories

ARCHITECTURAL RECORD. April 1946

A portfolio of articles, plans and "time-saver standards" for planning functional college residence halls.

College Dormitories—A Review

By Walter D. Cocking; AMERICAN SCHOOL AND UNIVERSITY 16. 1944 p. 95–97

Both a bibliography and an observation on the shift in emphasis from a boarding house to the educational laboratory type of dormitory.

Lagunita Court, A New Type of Dormitory for Women at Stamford University

By Barbara Ryan; AMERICAN SCHOOL AND UNIVERSITY 18. 1946 p. 110–113

Six "casas" make up this distinctive dormitory.

The Designing of College Dormitories

By Howard Dwight Smith; AMERICAN SCHOOL AND UNIVERSITY 12. 1940 p. 421–434

Problems of administration, construction and aesthetics may be solved cooperatively in planning a dormitory.

Bowman Hall, University of Kentucky

By John F. Wilson; AMERICAN SCHOOL AND UNIVERSITY 21. 1949–50 p. 167–170

A complete and beautiful quadrangle of men's residence halls.

The Modern College Dormitory, An Educational Enterprise

By Lowell A. Wrigley; AMERICAN SCHOOL AND UNIVERSITY 17. 1945 p. 95–102

The dormitory can contribute to the "well rounded educational program" which every college should provide for its students.

Dormitories

By Theodore J. Young; AMERICAN SCHOOL AND UNIVERSITY 22. 1950–51 p. 151–170

New college dormitories with new ideas for providing maximum fulfillment of student housing needs.

New Dormitory for Michigan State Normal College

By Benjamim Klager; AMERICAN SCHOOL AND UNIVERSITY 27. 1955–56 p. 347–350

Living quarters as a phase of meeting increased college enrollments.

Frear Hall, University of Hawaii

ARCHITECTURAL RECORD 115:4. April 1954 p. 163–166

"Angled" dormitory wings characterize this unique plan.

Food Services

Efficient Cafeteria and Kitchen Layouts for College Residence Halls

By J. Leslie Rollins; AMERICAN SCHOOL AND UNIVERSITY 14. 1942 p. 333-339

Planning space efficiently for feeding college students.

Planning Kitchens for Residence Halls

By Margaret E. Terrell; AMERICAN SCHOOL AND UNIVERSITY 11. 1939 p. 413–418

Needed space and equipment for preparing and serving food.

Serving the College Community at San Francisco State College

By Erna Lehan; AMERICAN SCHOOL AND UNIVERSITY 27. 1955–56 p. 341–346

Description of a new college union dining hall.

Planning

Research in Plant Planning, Cleveland College Conference I, Cleveland College Conference II

AMERICAN SCHOOL AND UNIVERSITY 21. 1949–50 p. 81–91, 101–110

Proposed types of research needed to determine college and university plant needs. How to plan and design a center for an undergraduate program.

Planning Problems of Colleges and Universities

By Carl Feiss; AMERICAN SCHOOL AND UNIVERSITY 20. 1948–49 p. 32–37

Suggestions for a master plan which take into account special sentimental and other factors peculiar to colleges.

Planning the Campus of Brandeis University

By Eero Saarinen and Associates; AMERICAN SCHOOL AND UNIVERSITY 23. 1951–52 p. 313–326

Well illustrated master plan for a modern university.

Planning College and University Buildings

By Frank W. Hart; AMERICAN SCHOOL AND UNIVERSITY 23. 1951–52 p. 121–124

An interesting description of important factors which should receive emphasis in planning new college facilities.

Building Needs and Priorities of a State University

By Harvey H. Davis; AMERICAN SCHOOL AND UNIVERSITY 25. 1953–54 p. 133–138

Gives plan for long-term, flexible university building program.

Planning a Modern University

By Julian Whittlesey; AMERICAN SCHOOL AND UNIVERSITY 23. 1951–52 p. 307–312

A résumé of the development of complete university facilities in India.

Promising Practices in the Educational Planning of New College Buildings

By Harvey H. Davis and Leslie G. Moeller; AMERICAN SCHOOL AND UNIVERSITY 27. 1955–56 p. 319–326

Faculty participation in planning pays off.

College Buildings

ARCHITECTURAL RECORD 113:6. June 1953 Building Types Study 199 p. 121–149

A comprehensive section on ways that some officials of higher education are planning to meet increased enrollments.

Student Union

Planning the College Union

By Michael M. Hare; AMERICAN SCHOOL AND UNIVERSITY 20. 1948–49 p. 161–166

Centrally located, controlled and designed for special needs.

At University of Missouri: Student Union Memorial for Two Wars

By Jack G. Taylor; AMERICAN SCHOOL AND UNIVERSITY 26. 1954–55 p. 345

Activities and spaces planned for a student union.

Memorial Union for University of Maine Student Activities

By Brooks W. Hamilton; AMERICAN SCHOOL AND UNIVERSITY 26. 1954–55 p. 341

Student union enhances social and cultural life.

Other Buildings

School of Business Administration, University of Michigan

ARCHITECTURAL RECORD 107. March 1950 p. 87–93

Electrical Engineering Building, University of Washington, Seattle

ARCHITECTURAL RECORD 106. December 1949 p. 104–109

Architectural School: Auburn, Alabama

PROGRESSIVE ARCHITECTURE 35:4. April 1954 p. 103–105

Medical Research Building, Emory University

By Nell M. Irvin; AMERICAN SCHOOL AND UNIVERSITY 26. 1954–55 p. 367

Faculty-Designed School of Architecture Building, Georgia Institute of Technology

By Blake R. Van Leer; AMERICAN SCHOOL AND UNIVERSITY 26. 1954–55 p. 361

Special Schools

Schools for the Handicapped

By F. Cuthbert Salmon; THE SCHOOL EXECUTIVE 71. February 1952 p. 46–53

Well illustrated article on housing the physically handicapped pupil.

Syracuse University Meets the Challenge of the Exceptional Child

By William M. Cruickshank; AMERICAN SCHOOL AND UNIVERSITY 26. 1954–55 p. 317

A building planned to aid the preparation of those who plan to teach exceptional children.

Clinic Nursery School

PROGRESSIVE ARCHITECTURE 35:7. July 1954 p. 94–97

A building planned to reach and help the hard of hearing.

THE BUILDING SPACES

Arts and Crafts

University Fine Arts Center

By Norman DeMarco; AMERICAN SCHOOL AND UNIVERSITY 25. 1953–54 p. 185–192

How the University of Arkansas provided an adequate place for its fine arts program.

Planning the Ceramics Shop

By F. Carleton Ball; AMERICAN SCHOOL AND UNIVERSITY 25. 1953–54 p. 341–348

Provision for all the specialized equipment used in ceramics work.

Texas Christian University's Fine Arts Building and Auditorium

By Paul O. Ridings and Gordon C. Lund; AMERICAN SCHOOL AND UNIVERSITY 22. 1950–51 p. 145–150

Description and plans of the $1.7 million fine arts school.

Art Rooms for New School Buildings

By Leon L. Winslow; AMERICAN SCHOOL BOARD JOURNAL 122. January 1951 p. 29–31

Description of specifications for an ideal art room.

The Arts and Crafts Shop

By Willie H. Hinely; AMERICAN SCHOOL AND UNIVERSITY 25. 1953–54 p. 335–340

Solutions to problems common to planners of arts and crafts shops.

Providing Building and Teaching Facilities for Art Education

By Leon L. Winslow; AMERICAN SCHOOL BOARD JOURNAL 114:2. February 1947 p. 31–35

Suggestions for planning art rooms, with lists of equipment needed for a complete program.

Facilities for Programs of Arts and Crafts: A Symposium

AMERICAN SCHOOL AND UNIVERSITY 27. 1955–56

Programs and facilities for seven schools.

Auditoriums and Stages

Planning and Equipping the Educational Theatre

By A. S. Gillette; The National Thespian Society, College Hill Station, Cincinnati, Ohio. 1945 31 pp.

The structural needs of a school theatre are shown as these needs grow from their functions.

The Auditorium for the Small High School

By A. S. Gillette; AMERICAN SCHOOL BOARD JOURNAL 112:1. January 1946 p. 47–48

Lists stage and seating needs of a small auditorium.

"Don'ts" for the Secondary-School Theater

By Michael M. Hare; AMERICAN SCHOOL AND UNIVERSITY 14. 1942 p. 268–273

How it may be designed to serve its real purposes.

The School Auditorium—Its Purpose and Design

By W. Irvin Blundell and Lawrence B. Perkins; AMERICAN SCHOOL AND UNIVERSITY 25. 1953–54 p. 271–276

A new look at the school auditorium.

Planning the School Auditorium to Serve the Community's Needs

By Harry W. Gillies; THE SCHOOL EXECUTIVE 70. August 1951 p. 19–22

Brief statement especially suitable for lay persons.

Auditoriums and Stages

By John E. Nichols; THE SCHOOL EXECUTIVE 68:5. January 1949 p. 60–61

Lists 15 trends in auditorium and stage function and design.

The School Auditorium

Planning Section, THE SCHOOL EXECUTIVE 65:10. June 1946 p. 33–50

Schoolmen, architects and technicians point out problems and suggest solutions in the auditorium.

Planning Schools for Use of Audio-Visual Materials No. 2 Auditoriums

Department of A-V Instruction, National Education Association, February, 1953 36 pp. $1

Planning the auditorium for effective A-V use.

Essentials of Stage Design for Schools

By Wilfred F. Clapp and Laura V. Shaw; AMERICAN SCHOOL AND UNIVERSITY 26. 1954–55 p. 159

Emphasis in planning stage facilities should be on educational objectives.

Bus Garages

Designing the School Bus Garage

By Theron L. McCuen; NATION'S SCHOOLS 40:3. September 1947 p. 34–37

A layout for storage of many large buses.

Planning the School Bus Shop

By A. R. Meadows; AMERICAN SCHOOL AND UNIVERSITY 20. 1948–49 p. 263–266

General considerations and construction details.

Classrooms

What Is a Good Classroom?

By Archibald B. Shaw; THE SCHOOL EXECUTIVE 70. July 1951 p. 19–22

Emphasizes emotional climate necessary for classrooms.

Trends in Classroom Size

By Charles Bursch, Charles D. Gibson, and Henry L. Wright; THE SCHOOL EXECUTIVE 68:5. January 1949 p. 58–59

More floor area, more efficiently used, bounded with non-structural partitions make the modern classroom.

Elementary School Classroom Design and Equipment—Specifications of Teachers

Committee of Teachers, Elmont, L. I., New York; AMERICAN SCHOOL AND UNIVERSITY 18. 1946 p. 203–209

Teachers who use classrooms tell what kinds of rooms help them do their job better.

The Self-Contained Classroom—A Symposium

NATION'S SCHOOLS 48. January 1952 p. 65

A statement of the philosophy, practice, environment and planning involved in the self-contained classroom.

Better Planning for College Classrooms

By W. K. Harrison; AMERICAN SCHOOL AND UNIVERSITY 11. 1939 p. 288–291

Functional design applied to college classrooms.

Principles of the Coordinated Classroom—Portfolio on Schoolhouse Planning

NATION'S SCHOOLS 45. March 1950 p. 47–68

Applications of function, adaptability and aesthetics.

Elementary School Classroom

New England School Development Council; The Council, Peabody House, 13 Kirkland Street, Cambridge 38, Massachusetts. 1950. 80¢

Classrooms That Perform

By Bob H. Reed and William W. Caudill; AMERICAN SCHOOL AND UNIVERSITY 24. 1952–53 p. 327–350

A thoroughly researched and documented coverage with special emphasis on natural ventilation and lighting.

Features of Outstanding Classrooms

By Howard Eckel; AMERICAN SCHOOL AND UNIVERSITY 23. 1951–52 p. 143–150

An analysis of what sixty architects of outstanding school buildings believe to be best features of classroom design.

Self-Contained Classrooms Make the Grade

By Ralph W. Cherry; AMERICAN SCHOOL AND UNIVERSITY 27. 1955–56 p. 177–180

Flexible programming is aided by the self-contained classroom.

Portable Classrooms Love 'Em and Leave 'Em

By R. L. Williams; THE SCHOOL EXECUTIVE 73:2. October, 1953 p. 72

One solution to uneven enrollment growth.

4-Classroom Unit

By Donald Barthelme; THE SCHOOL EXECUTIVE 73:10. June 1954 p. 66

Description of development of the 4-classroom unit.

Laboratories for Learning

By N. L. Engelhardt, Jr.; AMERICAN SCHOOL AND UNIVERSITY 26. 1954–55 p. 135

Classrooms should be planned for a large number of activities.

Planning Schools for Use of Audio-Visual Materials No. 1 Classrooms

Department of Audio-Visual Instruction, National Education Association. July 1952 40 pp. $1

The classroom is the normal place for use of audio-visual materials. Audio-visual aids are a part of classroom learning.

Designing Elementary Classrooms

U. S. Department of Health, Education and Welfare, Office of Education, Special Publication No. 1, U. S. Government Printing Office 1953 55 pp. 35¢

An approach to the problem of classroom design in relation to the school child and program.

This Is Tomorrow's Classroom

AMERICAN SCHOOL BOARD JOURNAL 127:6. December 1953 p. 68

"Homelike atmosphere" created in a classroom.

Corridors

Multiple-Use Corridors

By Morris Ketchum, Jr.; AMERICAN SCHOOL AND UNIVERSITY 25. 1953–54 p. 303–308

Real economy by using corridors as educational spaces.

Where Does the Corridor Go from Here?

By John W. McLeod; AMERICAN SCHOOL AND UNIVERSITY 25. 1953–54 p. 297–302

An architect suggests functions for corridor spaces besides circulation.

Educational Use of Corridor Space

By George W. Holmes, III; AMERICAN SCHOOL AND UNIVERSITY 25. 1953–54 p. 291–296

Finds a number of ways in which corridors can be made to serve educational functions.

Corridors: Luxury or Necessity?

By Philip Will, Jr. and others; THE NATION'S SCHOOLS 54:3. September 1954 p. 65–76

Different solutions to the design of functional corridors for school buildings.

Custodians' Suite

The Janitor-Custodian's Headquarters

By L. O. Thompson and Bertram A. Betts; AMERICAN SCHOOL AND UNIVERSITY 19. 1947–48 p. 144–145

A plan for such a space—office, locker and workrooms.

Planning Adequate Space for the Custodian

By Richard L. Howland; AMERICAN SCHOOL AND UNIVERSITY 24. 1952–53 p. 293–298

Highly illustrated coverage of custodial spaces based on the responsibilities of the custodian in maintaining the school building.

Gymnasiums

Health, Physical Education and Recreation Facilities

By Carolyn W. Bookwalter and Karl W. Bookwalter; AMERICAN SCHOOL AND UNIVERSITY 21. 1949–50 p. 235–244

Extensive discussion of the specific facilities needed.

The Gymnasium As We See It

By Herbert Hoeltje and others; AMERICAN SCHOOL AND UNIVERSITY 21. 1949–50 p. 245–250

A secondary school gymnasium is planned.

Stadium Design for Low Cost Maintenance

By Morris Liebeskind; AMERICAN SCHOOL AND UNIVERSITY 19. 1947–48 p. 153–157

Construction materials, schedule of material and equipment.

Swimming Pool Standards

By Frederick W. Luehring; A. S. Barnes and Company, New York. 1939 274 pp. $5

Twenty criteria for the planning, construction, operation and maintenance of swimming pools.

College Physical Education Facilities

By E. D. Mitchell; AMERICAN SCHOOL AND UNIVERSITY 15. 1943 p. 152–159

Planning aids and bibliography on facilities and equipment.

Ski Shelters and Lodges

By Walter Kimball Mitchell, Jr.; AMERICAN SCHOOL AND UNIVERSITY 11. 1939 p. 265–269

How to plan this necessary accommodation for the skier.

A Guide for Planning Facilities for Athletics, Recreation, Physical and Health Education

National Facilities Conference; American Association for Health, Physical Education, and Recreation, N.E.A.; 1201 16th Street, N.W., Washington 6, D.C. 1947 127 pp. $1.50

The result of two weeks' work by a varied group in the field.

Swimming Pools for Schools

By Donald W. Neilson and John E. Nixon; University of Stanford Press. 1954

Translation of the educational objectives of swimming into facilities that will further those objectives.

Health Service Suite

Needed: Hygienic School Facilities

By W. F. Credle; THE SCHOOL EXECUTIVE 70:3. November 1950 p. 78–81

Attaining the best possible physical environment for children through a school health coordinating service.

Planning the Health Suite

By Harold M. Elsbree; NATION'S SCHOOLS 39:1. January 1947

The why, how and what of medical facilities at school.

The Health Suite

By Ursula M. Moran; AMERICAN SCHOOL AND UNIVERSITY 20. 1948–49 p. 287–288

A careful list of equipment and a floor plan.

Planning the School Health Suite

New York State Education Department; Albany: the Department. 1946 5 pp. 10¢

Facilities for the school physician, nurse and dentist.

Homemaking

Homemaking Program Determines Building Plan

By Mary Owen Fleming; AMERICAN SCHOOL AND UNIVERSITY 20. 1948–49 p. 150–156

Describes the procedures in planning the homemaking suite, involving staff, students and community.

Planning College Home Economics Departments

By Bess Hefflin, Mildred Sipp, and Sarah E. Cragwell; AMERICAN SCHOOL AND UNIVERSITY 18. 1946 p. 113–125

Three emphases on home—likeness, relation to curriculum and flexibility.

Planning the Homemaking Department

By Dorothy S. Lawson; AMERICAN SCHOOL AND UNIVERSITY 23. 1951–52 p. 165–172

A new philosophy in homemaking education by an expert.

Principles of Planning the Homemaking Department

By Anna Belle Robinson and William Hunt Scheick; Urbana, Illinois: University of Illinois, BULLETIN, vol. 41, No. 44. June 20, 1944 28 pp. 35¢

Visual aids for planning or remodeling a multi-purpose unit.

Needed Facilities for a Modern Homemaking Program

By Ruth C. Cowles; AMERICAN SCHOOL AND UNIVERSITY 27. 1955–56 p. 273–278

Homemaking facilities should reflect the family living concept.

Libraries

Dear Mr. Architect

American Library Association, Committee on Planning School Library Quarters. Chicago: the Association. 1946 13 pp.

Provision for library services, with recommended space, equipment and comfort needed by those services.

University Libraries

ARCHITECTURAL RECORD. November 1946

Principles, plans and bibliography on college library planning.

A Library for Tomorrow's Secondary School

By Mary Peacock Douglas; AMERICAN SCHOOL AND UNIVERSITY 25. 1953–54 p. 329–334

Planning the library to fit the secondary school program.

Planning the Junior College Library

By Cecil D. Hardesty; AMERICAN SCHOOL AND UNIVERSITY 12. 1940 p. 308–315

The choice between alternative features depends upon the function of the junior college.

Designing School Libraries

By John E. Hansen; AMERICAN SCHOOL AND UNIVERSITY 24. 1952–53 p. 275–278

General considerations of elementary and secondary school libraries. Illustrated with floor plans.

Proceedings of the 1954 Association of College and Reference Librarians Building Plans Institute

ACRL Monograph No. 11 1954 108 pp. American Library Association, Chicago 11.

Presentation and criticisms of plans of several college libraries.

Criteria for High School Library Spaces and Facilities

By Raymond G. Erbes, Jr.; AMERICAN SCHOOL AND UNIVERSITY 27. 1955–56 p. 267–272

Guide lines for planning the library.

Physical Requirements of the Elementary School Library

By James W. Tyler; THE SCHOOL EXECUTIVE 73:1. p. 71 September 1953

Adequate facilities for the modern school library must be planned from newer educational concepts.

Housing The School Library

By Raymond G. Erbes, Jr.; THE NATION'S SCHOOLS 53:4. April 1954 p. 63–76

Possible solutions in providing satisfactory library facilities.

Lunchrooms

School Lunchrooms and Kitchens

ARCHITECTURAL RECORD. January 1947

"Time-saver standards" showing food production flow and typical kitchens.

Planning the Lunch Kitchen in a Small School

By Marian Conklin Behr; AMERICAN SCHOOL BOARD JOURNAL, 110:2. February 1945 p. 45–46

Plans and elevations of a school kitchen for the hot lunch program of a small school.

Lunchrooms

By Gertrude N. Bowie; THE SCHOOL EXECUTIVE 68:5. January 1949 p. 70–71

Sixteen trends in lunchroom design—and a floor plan.

The High School Lunchroom of the Future

By N. L. Engelhardt, Sr.; AMERICAN SCHOOL AND UNIVERSITY 21. 1949–50 p. 251–254

Some underlying principles to be considered are given.

Planning the School Cafeteria for Multiple Use

By Edward Kromer; AMERICAN SCHOOL AND UNIVERSITY 17. 1945 p. 107–113

Based on the opinions of principals who have used cafeterias for varied purposes.

Planning the School Lunchroom

By Orpha Mae Thomas; AMERICAN SCHOOL AND UNIVERSITY 24. 1952–53 p. 285–288

A brief overview of lunchroom equipment, menus and their efficient and economical use.

Cafeteria Planning

Portfolio; NATION'S SCHOOLS 39:6. June 1947 p. 41–56

Plans of nine school lunchrooms for various sized schools.

Planning and Equipping School Lunchrooms

U. S. Office of Education; Bulletin 1946, No. 19. Washington, D.C.: U. S. Office of Education. 23 pp. 10¢

Suggestions for planning and appraising school lunchroom layouts, and a table outlining space and equipment needs.

Planning and Designing the Multi-Purpose Room in Elementary Schools

U. S. Department of Health, Education and Welfare, Office of Education, Special Publication No. 3, U. S. Government Printing Office 1954

How some schools have achieved economy through well planned multi-purpose rooms.

Serving Lunches in Classrooms

By F. O. Mooseberg; THE NATION'S SCHOOLS 52:3. September, 1953 p. 96

Increasing food service facilities without building expansion.

Music

Building Facilities for Music Education

By Clarence J. Best; THE SCHOOL EXECUTIVE 65:7. March 1946 p. 57–72

Taken from a Ph.D. dissertation, gives a summary of practices; recommends a separate building.

Equipping the Music Department

By Clarence J. Best; AMERICAN SCHOOL AND UNIVERSITY 18. 1946 p. 184–191

Equipment and storage needs in a high school suite.

Planning Rooms for Music Departments in Secondary Schools and Colleges

By Charles J. Lamp; AMERICAN SCHOOL AND UNIVERSITY 12. 1940 p. 301–308

Five basic factors in planning music rooms.

The Hall of Music at Purdue University

By Walter Scholer; AMERICAN SCHOOL AND UNIVERSITY 13. 1941 p. 316–321

Plans and pictures of the auditorium with 6,208 comfortable seats and good hearing and vision.

Offices

Planning the School Office—A Symposium

AMERICAN SCHOOL AND UNIVERSITY 15. 1943 p. 188–192

Functional planning, from the secretary's viewpoint.

Administration Building, University of Hawaii

ARCHITECTURAL RECORD 108. October 1950 p. 108–111

A building designed for beauty and efficiency.

Take a Look at Your Central Office Layout—A Symposium

THE SCHOOL EXECUTIVE 72. October 1952 p. 79–91

Covers function, design and criteria for central offices.

Planning School Administration Centers

By N. L. Engelhardt, Sr.; AMERICAN SCHOOL AND UNIVERSITY 25. 1953–54 p. 319–328

Community use considerations in planning school administrative facilities.

A New Education Center

By Ralph C. Dailard and Clyde Hufbauer; THE SCHOOL EXECUTIVE 72:11. July 1953 p. 65

Providing suitable, efficient facilities for central office needs.

Science

The Planning and Equipment of a Photographic Classroom

By R. H. Behrens; AMERICAN SCHOOL BOARD JOURNAL, 114:2. February 1947 p. 46–47

Laboratory and darkroom plans, and a basic equipment list.

Teaching Nature in New York's Science Centers

By Frances Westgate Butterfield; AMERICAN SCHOOL BOARD JOURNAL 113:4. October 1946 p. 23–24

A science center offers city children experiences with nature.

College Science Plant Facilities—A Review

By Walter D. Cocking; AMERICAN SCHOOL AND UNIVERSITY 16. 1944 p. 104–107

Each college science building is unique, but some help in planning is available. Bibliography is good.

Facilities for Science Teacher Education

By John S. Richardson, G. P. Cahoon, Ralph W. Lefler; AMERICAN SCHOOL AND UNIVERSITY 24. 1952–53 p. 299–308

Suggestions for planning and equipping the college science teacher laboratory. Illustrated.

High School Science Facilities

By T. W. Munch and W. J. Pelton; AMERICAN SCHOOL BOARD JOURNAL 126:1. January 1953 p. 55-57

Guides to the design of science facilities for a modern high school.

A New Design in Laboratory Furniture

By S. S. Coston; THE SCHOOL EXECUTIVE 72:6. February 1953 p. 60

Types of equipment being used in functional science laboratories.

Science Facilities for the Modern High School

By Paul H. De Hurd; Stanford University Press 1954 Monograph No. 2. 52 pp.

Planning facilities for a dynamic science program. Educational justification for flexible facilities for teaching science.

Shops—General

Suggestions for Planning Industrial Arts Facilities

By Elroy W. Bollinger; AMERICAN SCHOOL AND UNIVERSITY 21. 1949–50 p. 211–220

Aids in designing plant facilities for the teaching of industrial arts.

Facilities for Making and Repairing Things

By G. Wesley Ketcham; THE SCHOOL EXECUTIVE 66:4. December 1946 p. 46–47

How to offer the community practical leisure-time activities in the school building.

Planning the Agricultural and Industrial Arts Shops for Central Rural Schools

By the New York State Education Department; Albany: the Department. 1946 11 pp. 10¢

A guide to planning for schools with limited shop space.

Shops and Laboratories

Planning Section; THE SCHOOL EXECUTIVE 65:11. July 1946 p. 41–54

Discusses general shops, laboratories for social studies, speech, functional and fine arts and a science laboratory-workshop.

School Shop for General Education

ARCHITECTURAL RECORD. July 1946

A series illustrating the design of an extensive industrial arts shop; for architects, "time saver standards" for equipment.

Third Dimension Shop Layout

By Gilbert G. Weaver; AMERICAN SCHOOL BOARD JOURNAL 113:6. December 1946 p. 46

A new technique for avoiding "bugs" in shop planning.

Time Saver Standards—School Shop Planning

ARCHITECTURAL RECORD 114:1 and 2. July p. 191–195 and August p. 187–191.

Diagrams of award winners for shop layouts at the American Vocational Association Convention.

Ceiling Height in School Shop Planning

By R. A. Rodthe; Industrial Arts and Vocational Education September, 1953 p. 211

Criteria for measuring ceiling heights of shops.

Planning School Shop Facilities

By Welcome E. Wright; AMERICAN SCHOOL AND UNIVERSITY 26. 1954–55 p. 145

Factors to consider in planning the school shop.

Storage

Storage Facilities in School Buildings

By N. L. Engelhardt, N. L. Engelhardt, Jr., and Stanton Leggett; THE SCHOOL EXECUTIVE 68:11. July 1949 p. 37

Facilities suited to materials stored and providing protection and accessibility.

Storage Space

By Warren S. Holmes; THE SCHOOL EXECUTIVE 68:5. January 1949 p. 74–75

Requirements for storage, and plan for built-in space.

Storage Cabinet Assemblies as Dividing Partitions

By John W. McLeod; AMERICAN SCHOOL AND UNIVERSITY 21. 1949–50 p. 221–227

A way to divide educational spaces and have the advantages of interchangeability and adequate storage.

The Case for Case Work

By Lawrence B. Perkins; Bulletin of the A.I.A.; September-October, 1953. p. 153–156

Explains why it is often simpler to design storage units than to buy them.

Teachers' Rooms

Teachers' Rooms

By James H. Bailey; THE SCHOOL EXECUTIVE 68:5. January 1949 p. 72–73

Ingenious rooms, well planned for teacher comfort.

Adequate Facilities for Teachers

By Walter D. Cocking; THE SCHOOL EXECUTIVE 67:10. June 1948 p. 5

A plea for home-like space for teachers which will bolster their morale and efficiency.

Needed: Better Teachers' Facilities

By J. Stanley Sharp; AMERICAN SCHOOL AND UNIVERSITY 27. 1955–56 p. 311–314

Provision of space for teachers to relax and "get-together" is a wise long-range investment when a school is being planned.

Vocational Training

Planning an Efficient Graphic Arts Department

By John A. Backus; AMERICAN SCHOOL BOARD JOURNAL 114:1. January 1947 p. 53–55

Plans and activities in school printing departments are analyzed.

A Vocational Building for War and Peace

By Franklin S. Barry; THE AMERICAN SCHOOL BOARD JOURNAL 110:1. January 1945 p. 36–38

Plan and description of a building which provides machine, industrial arts and agriculture shops and a recitation room.

Plant Facilities for Vocational Agriculture-Classroom and Shop and the School-Community Cannery

By D. M. Clements, A. H. Hollenberg, and R. E. Naugher: AMERICAN SCHOOL AND UNIVERSITY 18. 1946 p. 161–170

Typical plans and hints for adapting them to local needs.

Building Facilities and Equipment for Business Education

By Albert C. Fries; AMERICAN SCHOOL AND UNIVERSITY 18. 1946 p. 155–159

Includes principles, plans and equipment lists for high school business departments.

Planning Housing and Equipment for a Vocational Program

By Harrison C. Givens; AMERICAN SCHOOL AND UNIVERSITY 17. 1945 p. 78–83

The importance of determining the needs of the program before costs become fixed is emphasized in this article.

The Planning of Vocational Departments in High Schools

By Maximillian Komow; AMERICAN SCHOOL BOARD JOURNAL 108:1. January 1944

Designing and equipping general and special school shops.

Practical Factors in the Design of All Day Trade Schools

By H. W. Paine; AMERICAN SCHOOL BOARD JOURNAL 112:12, 113:1 and 113:2. June, July and August 1946

A detailed outline of trade school functions and space needs.

Planning the Business Education Facilities

By Carl Payne; The University of the State of New York Press, Albany. 1948 11 pp. 10¢

Discusses location and plans of business education rooms.

Planning and Equipping a Clerical Practice Room

By Elizabeth Van Derveer; AMERICAN SCHOOL AND UNIVERSITY 21. 1949–50 p. 228–234

Room plans and types of equipment for teaching clerical skills.

THE BUILDING—TECHNICAL AND GENERAL ASPECTS

Acoustical Control

Sound

THE ARCHITECTURAL FORUM, New York. November 1948 p. 126–133

Form, dimension and materials—all in the architect's domain—govern its behavior.

Less Noise, Better Hearing

By Hale J. Sabine; The Celotex Corporation, New York. 1941 32 pp. $1.00

An outline of the essentials of architectural acoustics.

Good Hearing Conditions in Schools

By Karl R. Schwarz; AMERICAN SCHOOL AND UNIVERSITY 19. 1947–48 p. 117

A simple technical discussion on improving hearing conditions.

Engineering for Sound Control in School Buildings

By Robert A. Hanle; AMERICAN SCHOOL AND UNIVERSITY 26. 1954–55 p. 401

The main problems confronted in acoustical control and possible solutions to them.

Adaptability

What We Like About One-Story Schools

By Wilfred F. Clapp; ARCHITECTURAL RECORD 103. March 1948 p. 119–121

Their economy, flexibility, as well as educational desirability.

Trends in Multi-Purpose Rooms

By Archibald B. Shaw; AMERICAN SCHOOL AND UNIVERSITY 24. 1952–53 p. 279–284

A brief history of the evolution of multi-purpose rooms and the outlook for the future.

Problems in Design and Operation Caused by Multiple Use of the School Plant

By Don L. Essex; AMERICAN SCHOOL AND UNIVERSITY 17. 1945 p. 68–71

Pre-planning for community use helps keep costs lower.

Flexible School Buildings

Planning Section; THE SCHOOL EXECUTIVE 65:9. May 1946 p. 55–74

Varying points of view on ways to achieve flexibility—architects, local, state and federal schoolmen.

Flexible Interiors

By Jay C. Van Nuys; THE SCHOOL EXECUTIVE 68:5. January 1949 p. 54–55

Achieving flexibility of interior spaces through modular construction.

Block Built Elementary School

ARCHITECTURAL FORUM 100:3. March 1954 p. 110–117

Unit by unit planning will result in flexibility and economy.

Cahuilla Elementary School—Designed for Multi-Stage Construction

ARCHITECTURAL RECORD 113:1. January 1953 p. 117–123

An example of how flexibility can be achieved. The school mirrors its community in character and planning.

Audio-Visual

Architect's Visual Equipment Handbook

Bell and Howell, Chicago. 30 pp. Gratis

Information on planning projection and sound equipment in schools, and the fundamentals of acoustical treatment in auditoriums.

Effective Use of Audio-Visual Aids Through Building Design

By Anna Hyer, A. J. Foy Cross, and Don White; AMERICAN SCHOOL AND UNIVERSITY 25. 1953 p. 349–358

Three audio-visual experts discuss the classroom requirements for audio-visual facilities, the instructional materials center and auditoriums.

Standards for Visual and Auditory Facilities in New Educational Buildings

By Irvine H. Millgate and O. H. Coelln, Jr.; AMERICAN SCHOOL AND UNIVERSITY 18. 1946 p. 136–151

Definitive statements about both plant and equipment facilities, well illustrated.

Practices in Audio-Visual Education and Services

By Alphonse Heningburg; AMERICAN SCHOOL AND UNIVERSITY 27. 1955–56 p. 371–378

Review of practices and services in selected schoo' systems.

Make Room for the Use of Audio-Visual Aids

By Earl F. Strohbehn; AMERICAN SCHOOL AND UNIVERSITY 27. 1955–56 p. 383–390

Helpful suggestions on the various uses of audio-visual aids.

For Today's Classrooms—An Organized Audio-Visual Aids Program

By J. V. La Clair; AMERICAN SCHOOL AND UNIVERSITY 27. 1955–56 p. 379–382

Hints on planning a successful audio-visual program for today's schools.

Central Sound Systems

School Sound Systems

Joint Committee on Standards for School Audio Equipment, U. S. Office of Education and Radio Manufacturers Association, Washington. 1946

A summary of basic standards for school sound systems.

School Sound Systems

By William A. Veit; AMERICAN SCHOOL AND UNIVERSITY 22. 1950–51 p. 356–360

Planning school sound systems for all phases of educational and administrative activities.

Color

Color Planning for School Interiors

By William C. Davini, and others; The Board of Education, St. Paul, Minnesota. 1948 $2

Principles involved and applications of color for light and psychological rightness.

Put Color to Work

By Faber Birren; AMERICAN SCHOOL AND UNIVERSITY 24. 1952–53 p. 355–358

A brief discourse on the functional application of color in school buildings is given by a recognized color consultant.

Colors for School Interiors

By William C. Davini; AMERICAN SCHOOL AND UNIVERSITY 24. 1952–53 p. 359–362

Suggests specific applications of color for school interiors.

Psychological Considerations of Color Selection

By Fred E. Harris and Robert E. Bills; AMERICAN SCHOOL AND UNIVERSITY 25. 1953–54 p. 157–160

Analyzes color as it functions in varying human environments, and particularly its relation to school children.

Decorating School Interiors

By Julian E. Garnsey; AMERICAN SCHOOL AND UNIVERSITY 25. 1953–54 p. 309–312

Color specialist applies art fundamentals to the classroom.

Classroom Finishes for Visual Comfort

By C. J. Allen; AMERICAN SCHOOL BOARD JOURNAL 126:1. January 1953 p. 58–60.

Light and paint are partners in creating the desired lighting effects.

Equipment

School Buildings and Equipment

American Council on Education Studies, Series I, Vol. 3, No. 8. 1939

The Junior High School, Its Furniture and Equipment

By Engelhardt, Engelhardt and Leggett, Educational Consultants, New York, New York. 1952 179 pp. $7.50

Comprehensive listing of equipment for junior high schools.

Flexible Classrooms

By Russell E. Wilson; Carter Company, Detroit, Michigan. 1953

Well illustrated, practical descriptions show how to achieve flexibility in classroom planning.

Selection of Equipment in Colleges

By Paul W. Seagers; AMERICAN SCHOOL AND UNIVERSITY 27. 1955–56 p. 361–364

Planned equipment selection for colleges and universities.

Selection of Equipment in High Schools

By Leo M. Casey; AMERICAN SCHOOL AND UNIVERSITY 27. 1955–56 p. 253–256

The who and why in selection of equipment.

Selection of Equipment in Elementary Schools

By David S. Brainerd; AMERICAN SCHOOL AND UNIVERSITY 27. 1955–56 p. 181–184

Guide lines for satisfactory equipment selection.

School Equipment—A Guide for Planning and Purchasing

New England School Development Council, Cambridge 38, Massachusetts. August 1954

Basic types of equipment and guides to selection.

Equipment Standards for Business Classrooms

By John E. Binion; Southwestern Publishing Company Monograph 88. Chicago 5. 1954

A thorough analysis of standards to guide selection of business classroom equipment.

Heating and Ventilating

Heating, Ventilating, Air Conditioning Guide, 1953

American Society of Heating and Ventilating Engineers. The Society, 51 Madison Avenue, New York. 1953

The whole problem, as the engineers see it.

Heat from the Earth

By George H. Bush; AMERICAN SCHOOL AND UNIVERSITY 20. 1948–49 p. 145–149

The present status of heat pumping. Bibliography.

Classroom Heating and Ventilating

By Henry Wright; AMERICAN SCHOOL AND UNIVERSITY 23. 1951–52 p. 197–216

A comprehensive coverage of ways for heating and ventilating classrooms.

Ventilation Requirements in Schools

By H. H. Linn; AMERICAN SCHOOL BOARD JOURNAL 114:1. January 1947 p. 50–52

Modern requirements for mechanical ventilation.

Unit Ventilation—Its History and Progress

By G. E. Otis; AMERICAN SCHOOL BOARD JOURNAL 114:1. January 1947 p. 29–31

Theory and practice in schoolroom heating and ventilation.

Better Air Distribution in the Schools

By Leonard R. Phillips; THE SCHOOL EXECUTIVE 68:3. November 1948 p. 46–47

A consulting engineer speaks for mechanical ventilation and air conditioning.

School Heating and Ventilating Practices in the United States

By H. W. Schmidt; AMERICAN SCHOOL BOARD JOURNAL 122:1. January 1951 p. 33–35

Present day practices in schools.

Radiant Heating

By Thomas L. Sciortino; AMERICAN SCHOOL AND UNIVERSITY 22. 1950–51 p. 351–355

Its merits, installation and dissimilarity to usual systems.

Heating with High Temperature Water Systems at Rutgers University

By Fred L. Moesel; AMERICAN SCHOOL AND UNIVERSITY 27. 1955–56 p. 409–414

New techniques in outside underground heat energy distribution systems.

Lighting—Daylight

Development of a Natural Daylighting System for Modern School Buildings

By Ernest J. Kump; AMERICAN SCHOOL BOARD JOURNAL 116:6. June 1948 p. 35–38

The evolution of daylight control in California.

Fenestration and School Lighting

By Eberle M. Smith; THE SCHOOL EXECUTIVE 66:6. February 1947 p. 65–66

Objectives and methods for achieving better natural light.

Top Lighting vs. Side Lighting for School Interiors

By Donald Barthelme; AMERICAN SCHOOL AND UNIVERSITY 26. 1954–55 p. 397

An analysis of the why of top lighting.

Plastic Skydomes Pay Daylighting Dividends

By Bernard F. Greene; AMERICAN SCHOOL AND UNIVERSITY 27. 1955–56 p. 405–408

An analysis of skydomes and their virtues.

Foster—Junior-Senior High School-Twin-Wing School

ARCHITECTURAL FORUM 98:5. May 1953 p. 112–118

Some solutions to natural lighting problems through use of plastic skylights and motor driven louvers.

Don't Overlook the Improvement in Ground Reflection in Daylighting

By J. W. Griffith and others; THE NATION'S SCHOOLS 51:5. May 1954 p. 69–71

The value of ground reflection is often overlooked.

Developments in Daylighting Schools Since World War II

By Domina Eberle Spencer; AMERICAN SCHOOL AND UNIVERSITY 27. 1955–56 p. 397–404

Emphasizes the state of flux in solving lighting problems.

Lighting—Electric

The American Standard Practice for School Lighting

Illuminating Engineering Society; AMERICAN SCHOOL AND UNIVERSITY 21. 1949–50 p. 266–283

A criteria of good illumination.

From Daylight to Darkness—Current Claims About School Lighting

By Howard Sharp; AMERICAN SCHOOL AND UNIVERSITY 23. 1951–52 p. 185–190

Some basic principles concerning school lighting.

School Lighting

ILLUMINATING ENGINEERING 48:6. June 1953

The entire issue of this publication is devoted to school lighting.

Lighting Standard Classrooms

By Robert L. Zahour; THE SCHOOL EXECUTIVE 73:9. May 1954 p. 60

Results and recommendations of a recent study of school lighting economics.

Plumbing

The Utilization of School Sanitary Facilities

American Council on Education; Studies in School Plant Research, No. 8, Washington, D.C.: The Council. 1942 35 pp. 25¢

Also abstracted in AMERICAN SCHOOL AND UNIVERSITY 20. 1948–49 p. 141

Suggests standards for adequate school sanitary facilities.

Suggestions for Plumbing and Sanitation in School Buildings

By Henry L. Blatner; AMERICAN SCHOOL AND UNIVERSITY 26. 1954–55 p. 415

Guides to comprehensive planning for plumbing facilities.

Toilet Provisions in Elementary Schools

By Hugh W. Hiatt; AMERICAN SCHOOL AND UNIVERSITY 26. 1954–55 p. 409

Four elements involved in planning elementary school toilet facilities.

Safety

The HELP FOR PLANNERS section of the bibliography includes references on both codes and standards and guides and manuals which apply to safety provisions for school facilities.

Elimination of Hazards in School Building

By Chester F. Miller; AMERICAN SCHOOL AND UNIVERSITY 13. 1941 p. 61–66

Many answers to: "Is this the safest way we can do it?"

The Safety Factor in School Building Planning

By H. W. Schmidt; AMERICAN SCHOOL BOARD JOURNAL 114:1. January 1947 p. 56–58

How to avoid dangers to life, limb and health in a school building.

School Plants Can Be Safe

By Marian Telford; THE SCHOOL EXECUTIVE 66:7. March 1947 p. 41–42

Primary safety problems in school plant planning.

School Safety

By D. K. Sargent; Bulletin of the American Institute of Architects. November–December 1953 Vol. 7:6

Points out ways to provide for safety beyond code requirements.

Structural Materials and Design

American Standards Association, Project A62

The Association, 70 E. 45th Street, New York 17, New York

Four standards under the A62 Series dealing with modular coordination are available.

Structural Design and Materials

By William W. Caudill; THE SCHOOL EXECUTIVE 68:5. January 1949 p. 52–53

The trends toward repetitive structural units, movable partitions, fewer and larger units and faster erection techniques.

Planning School Floors

By J. J. Collins; AMERICAN SCHOOL AND UNIVERSITY 22. 1950–51 p. 341–348

Extensive study on many types of flooring for schools.

What About New Materials?

By Paul W. Seagers; AMERICAN SCHOOL AND UNIVERSITY 24. 1952–53 p. 351–354

Résumé of trends in structural materials, lighting, heating and ventilation, plumbing, wiring, decoration and classroom equipment.

Economy by Modular Co-ordination

William Demarest, Jr.; AMERICAN SCHOOL AND UNIVERSITY 24. 1952–53 p. 170–176

Discusses modular design, how it works and its advantages.

Potentialities of Glass in Building

By Albert G. H. Dietz; ARCHITECTURAL RECORD 111. April 1951 p. 161–166

A critical review of the merits of different forms of glass as building materials by a professor of structural engineering.

Use of Precast Concrete in School Construction

By Doyt Early; AMERICAN SCHOOL AND UNIVERSITY 26. 1954–55 p. 419

Developments in precast concrete construction.

Reducing Costs in School Construction

By Henry H. Linn; AMERICAN SCHOOL BOARD JOURNAL 129:2, 3 and 4. August 1954 p. 50–51, September 1954 p. 41–42, October 1954 p. 41–42

Certain economies can be effected without jeopardizing the educational program.

BUILDINGS IN OTHER COUNTRIES

Suggestions for the Layout and Construction of Schools in Ontario

Department of Education; Toronto: the Department (mimeo)

Building Bulletins

Ministry of Education; H. M. Stationery Office, York House, Kingsway, London, W.C. 2, England
Bulletin I October 1950 44 pp.

Outlines recent trends in primary education in England and describes architectural implications.

Bulletin II February 1950 84 pp.

Recommended practices in constructing new secondary school buildings in England.

Planning the New Nursery Schools

Nursery Association of Great Britain; Britain; Bickley Kent: University of London Press, Ltd. 1945 40 pp.

Great Britain's point of view in planning facilities for young children is described.

Royal Gymnastics Institute, Stockholm

By G. Wejke and K. Odeon; ARCHITECTURAL REVIEW 103. January 1948 p. 19–22

Schools in the Tropics

By Richard J. Neutra and Robert E. Alexander; THE SCHOOL EXECUTIVE 73:3. November 1953 p. 62

An American Teacher Looks at Post-War German Schools

By Robert L. Taylor; THE SCHOOL EXECUTIVE 73:4. December 1953 p. 64

Features of post-war German school facilities.

GROUNDS

Camping

Basic Planning for Camping and Outdoor Education

By L. B. Sharp; AMERICAN SCHOOL AND UNIVERSITY 18. 1946 p. 192–198

What outdoor education means, and what schools can do about it.

Facilities for School Camping

By George W. and Louise Donaldson; AMERICAN SCHOOL AND UNIVERSITY 24. 1952–53 p. 417–423

Contains a résumé of current practice, selection of site and floor plans of school camps currently in force.

Landscaping

Planning the School Grounds

By Elton de Shaw; AMERICAN SCHOOL AND UNIVERSITY 23. 1951–52 p. 217–220

Some practical considerations in planning, landscaping, developing and equipping school grounds.

Landscape Architecture for Schools

By Prentiss French; AMERICAN SCHOOL AND UNIVERSITY 20. 1948–49 p. 113–117

Contributions the trained expert can make in site development.

Shrubbery for School Sites

By John L. Cameron; AMERICAN SCHOOL AND UNIVERSITY 25. 1953–54 p. 313–318

Careful planning makes shrubbery an integral part of the whole school site.

Planning and Landscaping School Grounds

By Earl F. Sykes; AMERICAN SCHOOL BOARD JOURNAL 112:6. June 1946 p. 45–48

Village and rural schools benefit from landscape planning.

Landscaping the School Site

By Robert Royston; AMERICAN SCHOOL AND UNIVERSITY 24. 1952–53 p. 259–262

A brief, illustrated review of concepts and practices.

Site Plot Planning Is Not a "Frill"

By Paul Tritenbach; THE SCHOOL EXECUTIVE 72:11. July 1953 p. 49

There is more to landscaping than the planting of trees.

Playgrounds

Miracle Dirt for Playground Surfacing

By O. R. Barhdoll; SCHOOL BUSINESS AFFAIRS 14:11. November 1948 p. 1

Detailed directions for use of natural rock asphalt as a quick economical surfacer of play areas.

The Planning of School Grounds for Community Use

By George D. Butler and F. Ellwood Allen; AMERICAN SCHOOL AND UNIVERSITY 14. 1942 p. 212–217

How school grounds can be a community recreation resource.

Playgrounds

By Ray L. Hamon; Interstate School Building Service, George Peabody College, Nashville, Tenn. 1942 12 pp.

Suggestions for planning playgrounds to serve all pupils.

Playground Equipment

ARCHITECTURAL RECORD. March 1947

"Time saver standards" detailing safe, inexpensive and popular items of permanent playground equipment.

Playground Surfacing

By R. W. Shafer; AMERICAN SCHOOL AND UNIVERSITY 20. 1948–49 p. 118–123

Soil-stabilization is carefully described.

What About Facilities for Recreation?

National Association of Secondary School Principals Bulletin 37. May 1953 p. 36–40

Guides to follow in planning recreational facilities for the school and community.

Site Selection

A Rural Community—Its School Sites

By Theodore W. Boston; AMERICAN SCHOOL AND UNIVERSITY 22. 1950–51 p. 277–280

Anticipating future needs for sites in expanding school programs.

Use-Plan of a Large Site for a Secondary School

By Elmer H. Garinger and J. A. Stenhouse; AMERICAN SCHOOL AND UNIVERSITY 21. 1949–50 p. 255–260

Factors considered in developing a 75-acre site for a high school project.

Land Use and Site Development

By John McFadrean; THE NATION'S SCHOOLS 54:6 December 1954 p. 62–67

Site development is too often neglected.

New Orleans Plan for a "Village" School

By Charles Colbert; ARCHITECTURAL FORUM 98:4. April 1953 p. 129–135

Shows ways in which site selection problems have been overcome. Site selection must anticipate long-range building plans.

New Concepts in Planning the School Site

By George H. Stoner; AMERICAN SCHOOL AND UNIVERSITY 25. 1953–54 p. 153–156

Desirable solutions to site selection dictate a broader treatment of the whole school building problem.

Winter Sports

The Construction of Ski-jumps

By Lawrence E. Briggs; AMERICAN SCHOOL AND UNIVERSITY 11. 1939 p. 248–253

The characteristics of a well built ski-jump.

A Well-Balanced Physical Education Program Should Provide for Winter Sports Trends

By Harold M. Gore; AMERICAN SCHOOL AND UNIVERSITY 11. 1939 p. 235–240

Broader concepts of physical education bring increased interest in winter sports and consequent need for facilities.

Design and Construction of Ski-Tows

By Paul S. Putnam; AMERICAN SCHOOL AND UNIVERSITY 11. 1939 p. 254–258

Five basic types of ski-tow, and how to plan each.

Ice Sports at Schools and Colleges

By Russell L. Snow; AMERICAN SCHOOL AND UNIVERSITY 11. 1939 p. 259–264

Design and maintenance of natural and artificial skating areas.

Downhill Ski Trails

By Robert W. Vincent; AMERICAN SCHOOL AND UNIVERSITY 11. 1939 p. 244–248

Balancing interest and safety in ski-trail construction.

PLANNING

The Architect

Building Type Reference Guide No. 1—The School Building

Bulletin of the American Institute of Architects, v. 1, American Institute of Architects, Washington. March 1947 50¢

Basic data for architects planning educational buildings, assembled by the Department of Education and Research of the architects' national organization.

Public Relations for Architects

By Maurice Postley; AMERICAN SCHOOL AND UNIVERSITY 23. 1951–52 p. 79–82

Hints to the school architect on how to deal with his public.

College Architecture in Transition

By Lorimer Rich; AMERICAN SCHOOL AND UNIVERSITY 20. 1948–49 p. 109–112

A plea for appropriate design of utility, strength and beauty.

Where Do School Design Specialists Fit?

By Paul W. Seagers; ARCHITECTURAL RECORD 111. November 1951 p. 144–147

A definition of roles for the citizen, school official, architect and educational consultant in school plant planning.

Schools—Building Types Study #207

ARCHITECTURAL RECORD 115:2. February 1954 p. 149–180

Architects analyze their solutions to building problems.

Considerations in Selecting a School Architect

By Harold Silverthorne; AMERICAN SCHOOL AND UNIVERSITY 27. 1955–56 p. 139–144

Selection of the architect should be done systematically.

An Architect Views the Client's Role in School Plant Planning

By Robert E. Alexander; AMERICAN SCHOOL AND UNIVERSITY 27. 1955–56 p. 145–148

The architect's role in cooperative building planning.

The Board and the Superintendent

Providing Appropriate Housing for Schools

By Charles Bursch; *Changing Concepts in Educational Administration*, National Society for the Study of Education, 45th Yearbook Part II p. 161–175, Chicago: University of Chicago Press. 1946

A clear statement of the school administrator's responsibility in achieving sound educational plants.

School Board's Responsibilities for School Plants

By Calvin Grieder; AMERICAN SCHOOL AND UNIVERSITY 20. 1948–49 p. 99–101

A list of responsibilities, discussed briefly.

Planning and Designing a School Plant

THE SCHOOL EXECUTIVE 72. December 1952 p. 58–60

A statement on relationships and responsibilities of all concerned in school plant planning by the school committee of the A.I.A. and a special committee of the National Council on Schoolhouse Construction.

Classrooms for How Many?

New York State Commission on School Buildings, Albany. December 1952 84 pp.

A handbook to help improve enrollment estimates and help make more effective their use.

A Comparison of Old and New School Buildings

THE SCHOOL EXECUTIVE 73:3. November 1953 p. 59

Differences between "old" and "new" schools.

Planning an Award-Winning Annex to the White Oaks School

By Ruth W. Melendy; THE SCHOOL EXECUTIVE 73:9. May 1954 p. 64

School Board and Park Board Cooperate

ARCHITECTURAL RECORD 116:1. July 1954 p. 123–127

Parks-School Cooperation Adds to Funds

ARCHITECTURAL RECORD 115:1. January 1954 p. 150–151

Coordination with Civic Planners

The School and City and Regional Planning

By Henrich H. Waechter; AMERICAN SCHOOL AND UNIVERSITY 25. 1953–54 p. 119–128

Replacing traditional planning methods with a master plan.

The Darien School: How an Architect Helps a Community to Determine Its School Plant Needs

By Stanley Sharp; AMERICAN SCHOOL AND UNIVERSITY 23. 1951–52 p. 105–116

Building program in Darien, Connecticut, is new interpretation of educational needs and cooperative planning.

The Relation of School Plant Planning to Total Community Planning

By Mary McLean; AMERICAN SCHOOL AND UNIVERSITY 25. 1953–54 p. 109–118

Important considerations for urban school planning.

Plan the School for the Program

By George W. Holmes III; THE SCHOOL EXECUTIVE 73:7. March 1954 p. 19

Key considerations in planning a new building.

Citizens Survey Report: Union Free School District No. 20 Lynbrook, New York

Institute of Field Studies, Teachers College, Columbia University, New York. September 1954

A report of a citizens survey of existing and needed school plant facilities.

Planning an Elementary School

By Archibald B. Shaw and Lawrence B. Perkins; THE SCHOOL EXECUTIVE 73:11. July 1954

How a community planned a "modern" elementary school.

Finance

The State's Function in Financing Schools

By Edgar L. Morphet and Theodore Reller; AMERICAN SCHOOL AND UNIVERSITY 23. 1951–52 p. 65–78

Factors leading to state participation in financing school capital programs including examples of various plans.

What Are Your School Bonds Worth?

By Herbert B. Mulford; AMERICAN SCHOOL BOARD JOURNAL 112:1. January 1946

How to determine the price the board should pay for its building money.

Sound Financing Necessary for Adequate Schoolhousing

By Edgar L. Morphet; AMERICAN SCHOOL BOARD JOURNAL 124. February 1952 p. 31–33

An overview of existing finance plans with emphasis on the Florida plan.

School Building Costs and Bond Prices

By Harold F. Clark; THE SCHOOL EXECUTIVE 73:5, 6, 8, 10, 12 and 74:2, 4. January, February, April, June, August, October and December 1954

Economic analyses of the changes in costs and bond prices.

Units of Cost for Comparing School Buildings

By Alonzo J. Harriman and Paul P. Wheeler; AMERICAN SCHOOL AND UNIVERSITY 27. 1955–56 p. 133–138

Reasons why cost comparisons should not be taken at face value.

Significant Trends in State and Federal Support for School Buildings

By R. L. Johns; AMERICAN SCHOOL AND UNIVERSITY 27. 1955–56 p. 123–126

An overview of ways in which school buildings are and can be financed.

School and Municipal Relationships in Overall Community Planning

By A. Benjamin Handler; AMERICAN SCHOOL AND UNIVERSITY 27. 1955–56 p. 117–122

Coordination of planning efforts resolves many problems.

A Better Way to Measure School Costs

ARCHITECTURAL RECORD 100:3. March 1954 p. 130–131

Clarification of faulty versions of cost comparisons.

Procedures

Planning Procedures

By Charles W. Bursch; REVIEW OF EDUCATIONAL RESEARCH 18:1. February 1948 p. 16–21

Reviews the research and publications in the field of planning for the preceding three years.

Your Schools

By William W. Caudill; Texas Engineering Experiment Station, Texas A&M College, College Station, Texas. 1950 43 pp.

An approach to long-range planning of school buildings.

Do's and Don'ts for Planning the School Plant

By George W. Holmes, III; AMERICAN SCHOOL AND UNIVERSITY 24. 1952–53 p. 143–146

A list of steps covering all phases of plant planning.

A Community Studies Its School Plant Problems

By E. J. Juckett; AMERICAN SCHOOL AND UNIVERSITY 23. 1951–52 p. 93–104

A step-by-step description of policies and methods used by a school district to plan, design and finance a new school.

Co-operative Planning of School Plants

By Wilfred F. Clapp; AMERICAN SCHOOL AND UNIVERSITY 24. 1952–53 p. 161–164

Brief coverage of the two phases in planning.

Community Participation in School Building Planning

By Paul W. Seagers; Teachers College, Columbia University, New York. (Doctoral dissertation.)

You Want to Build a School?

By Charles Bursch and John Lyon Reid; New York: Reinhold Publishing Corporation. 1947 128 pp. $4

Emphasis on how to design rather than which design is desirable.

Using a New School—A Symposium

THE SCHOOL EXECUTIVE 71. December 1951 p. 59–70

Practical suggestions for teaching the staff and community the proper use of their new school building.

School Plant Needs of Bloomfield, New Jersey

Institute of Field Studies, Teachers College, Columbia University, New York. September 1954

A survey of existing and needed school plant facilities.

Better Plants for Less Money

By Walter D. Cocking; THE SCHOOL EXECUTIVE 72:7. March 1953 p. 7

Ways in which we can build more adequate facilities for less money.

Two Schools, Gym, Shop Wing and Heating Plant for $540,000

By Robert W. Gibson; THE SCHOOL EXECUTIVE 73:1. September 1953 p. 64

Problems confronted in a building program and a solution to them.

Forecasting School Enrollments

Metropolitan School Study Council, New York 27, New York. 30 pp. A study of school enrollment forecasts.

TRENDS IN PROGRAM AND DESIGN

Forum on School Building—1953

ARCHITECTURAL FORUM 99:4. October 1953 p. 118–188

Discussion of most phases of schoolhouse construction.

America's Outstanding School Buildings Built Since 1945

By Walter D. Cocking and Robert L. Hopper; AMERICAN SCHOOL AND UNIVERSITY 22. 1950–51 p. 175–206

State departments of education submit their choices of outstanding school buildings in the nation.

Schools Are for Children

By Elizabeth B. Mock and Rudolf Mock; AMERICAN SCHOOL AND UNIVERSITY 15. 1943 p. 37–42

The importance of the psychological effect of the school building upon children.

The Economy of Contemporary Design

By Jay C. Van Nuys; AMERICAN SCHOOL AND UNIVERSITY 21. 1949–50 p. 55–58

The advantages of new modes of design over traditional.

Adequate Housing and Modern Education

By Nelson E. Viles; SCHOOL LIFE 31:5. February 1949

Modern education demands modern housing.

Educational Buildings

PROGRESSIVE ARCHITECTURE 34:1. January 1953 p. 79–89

Several illustrations of design solutions for a functional program.

Human Values in School Architecture

By John Lyon Reid; AMERICAN SCHOOL AND UNIVERSITY 27. 1955–56 p. 113–116

Relating principles of architecture to school plant design.

Changing Secondary School Programs and Their Implications for School Design

By G. Robert Koopman; AMERICAN SCHOOL AND UNIVERSITY 27. 1955–56 p. 199–204

Educational planning should anticipate a changing curriculum.

An Analysis of Contemporary School Design—Parts I and II

By Karl T. Hereford; THE SCHOOL EXECUTIVE 72:9 and 10. May and June 1953 p. 75; p. 81

Design trends for various of the interior spaces.

The School Executive's Third Annual Competition for Better School Design

THE SCHOOL EXECUTIVE 73:7. March 1954 p. 43–73

1953 winners. Problems confronted and solutions presented by winners.

Educator and Architect Take a Look at New Schools

By Karl T. Hereford and Kenneth Gibbons; THE SCHOOL EXECUTIVE 73:8. April 1954 p. 63

An analysis of current building practices.

Schools: Building Types Study #202

ARCHITECTURAL RECORD 114:3. September 1953 p. 141–198

A series on design trends for many of the organizations to be housed.

Schools: Building Types Study #213

ARCHITECTURAL RECORD 116:2. August 1954 p. 142–168

Design features of buildings from various areas.

Schools: Building Types Study #216

By Charles D. Gibson and others; ARCHITECTURAL RECORD 116:5. November 1954 p. 177–217

All design features of a school must be considered in the planning stages.

Secondary School Design Since World War II

By Walter D. Cocking; AMERICAN SCHOOL AND UNIVERSITY 27. 1955–56 p. 185–192

An analysis of postwar school design trends.

REMODELING OLD BUILDINGS

School Buildings: Remodeling, Rehabilitation, Modernization, Repair

U. S. Office of Education, Bulletin 1950 No. 17. Superintendent of Documents, Washington, D.C. 37 pp. 20¢

A discussion of ways to make an old building modern.

Modernizing School Buildings

By Henry H. Linn; AMERICAN SCHOOL AND UNIVERSITY 24. 1952–53 p. 401–405

Various factors to be considered in remodeling.

School Building Modernization Programs

By Graham R. Miller, Carl H. Schoene and Charles E. Armstrong, Jr.; AMERICAN SCHOOL AND UNIVERSITY 27. 1955–56 p. 365–370

Principles involved in considering modernization.

Abandon or Rebuild?

By M. W. Gaffney; AMERICAN SCHOOL BOARD JOURNAL 128:2. February 1954 p. 53–56

Factors to consider before undertaking a remodeling program.

PUBLISHED RESEARCH

Some General Considerations in the Natural Ventilation of Buildings

Number 22, February 1951

The Measurement of Low Air Speeds by the Use of Titanium Tetrachloride

Number 25, May 1951

The Feasibility of Using Models for Predetermining Natural Ventilation

Number 26, June 1951

An Experiment in Architectural Education Through Research

Number 32, November 1951

Air Flow Through Conventional Window Openings

Number 33, November 1951

Geometry of Classrooms as Related to Natural Lighting and Natural Ventilation

Number 36, July 1952

Effects of Landscape Development on the Natural Ventilation of Buildings and Their Adjacent Areas

Number 45, March 1954

Research Reports, Texas Engineering Experiment Station, The Texas A&M College System, College Station, Texas.

Unistrut School Construction

Engineering Research Institute, University of Michigan, Ann Arbor, Michigan. 1951

Report of a research project on the unistrut structural system.

1. **Quadruplex—A Scheme for a Four Classroom Unit**
2. **Programming the Laredo Schools**
3. **Selecting the School Site**
4. **An Approach to Design of a High School**
5. **Multi-Purpose Central Corridors**
6. **The Core—A Scheme for Facilitating Back-to-Back Classrooms**

RESEARCH PLUS ARCHITECTURE, Six Reports by Caudill, Rowlett, Scott and Associates, Architects–Engineers, 425 South Main Street, Bryan, Texas. (Not available for general distribution.)

Report of the Status Phase of the School Facilities Survey

U. S. Department of Health, Education and Welfare, Office of Education, School Housing Section, Washington, D.C. December 1953 140 pp. 70¢

Brings together data contained in the first and second progress reports of this survey. Information is also presented on the inventory of public school facilities and the ability of various states to finance school plants.

Educational Building in 1953, Educational Building in 1954

By the Editors; AMERICAN SCHOOL AND UNIVERSITY 26 and 27. 1954–55 p. 65–74. 1955–56 p. 65–72

Review and analysis of elementary, secondary and college buildings constructed during 1953 and 1954.

Caudill, Rowlett, Scott and Associates Research Reports:

1. **The Development of the Teaching Space Divider**

By William W. Caudill and Cleon C. Bellomy; AMERICAN SCHOOL AND UNIVERSITY 26. 1954–55 p. 433–436

Putting classroom walls to work.

2. **Spatial Approach to Planning the Physical Environment**

By William W. Caudill and Cleon C. Bellomy; AMERICAN SCHOOL AND UNIVERSITY 26. 1954–55 p. 437–440

Planning for freer and more natural architecture.

3. **Towards an Economical Flexibility**

By L. S. Richardson and William W. Caudill; AMERICAN SCHOOL AND UNIVERSITY 26. 1954–55 p. 441–448

An analysis of why buildings should be planned for flexibility and how such planning provided a solution for one community.

4. **An Analysis of Two Multi-Purpose Corridor Types**

By Al Harris and William W. Caudill; AMERICAN SCHOOL AND UNIVERSITY 27. 1955–56 p. 415–418

Multi-purpose corridors provide functional utility.

5. **Relationship of Cost to the Geometry of a Building**

By John M. Rowlett and Thomas A. Bullock; AMERICAN SCHOOL AND UNIVERSITY 27. 1955–56 p. 419–422

6. **Implications of Child Growth and Development for School Plant Design**

By Ralph W. Cherry; AMERICAN SCHOOL AND UNIVERSITY 27. 1955–56 p. 423–428

7. **"Glass Walls" and the Instructional Program**

By Paul R. Hensarling; AMERICAN SCHOOL AND UNIVERSITY 27. 1955–56 p. 429–436

Good and Bad School Plants in the United States

School Housing Section, U.S. Office of Education, Washington, D. C. June 1954 77 pp. 50¢

Good and bad school plants as revealed by the nationwide School Facilities Survey.

A STRUCTURAL MATERIALS

1. Exterior Walls

Alberene Stone Corporation of Virginia	A 11
Laclede Steel Company	A 12
Macomber Incorporated	A 13

2. Roofing

H. H. Robertson Company	**A–2/Ro**
Barrett Division, Allied Chemical & Dye Corporation	A 14
S. K. Insulrock Corporation	A 15
Rilco Laminated Products, Inc.	A 16, 17
Zonolite Company	A 18

3. Skylights & Glass Block

American 3 Way-Luxfer Prism Co.	**A–3/AmT**
Pittsburgh Corning Corporation	A 19
Kimble Glass Company, Subsidiary of Owens-Illinois	A 20, 21
Pittsburgh Corning Corporation	A 22

4. Windows

The Adams & Westlake Company	**A–4/Ad**
Aluminum Window Manufacturers Association	**A–4/Al**
Cupples Products Corporation	**A–4/Cu**
General Bronze Corporation	**A–4/Ge**
Libbey-Owens-Ford Glass Company	**A–4/LOF**
Marmet Corporation	**A–4/Ma**
Tru-Seal Window Division, Industrial Machine Tool Co. Inc.	A 23
The William Bayley Company	A 24, 25
Michael Flynn Manufacturing Co.	A 26, 27
Truscon Steel Division, Republic Steel	A 28, 29
Windalume Corporation	A 30

5. Window Shades

Joanna Western Mills Company	**A–5/Jo**
Columbus Coated Fabrics Corporation	A 31
Forse Manufacturing Company	A 32

6. Venetian Blinds

Kirsch Company	**A–6/Ki**
Levolor Lorentzen, Inc.	**A–6/Le**

8. Waterproofing

A. C. Horn Corporation	**A–8/Ho**
Standard Dry Wall Products, Inc.	**A–8/St**
Western Waterproofing Company, Inc.	A 34

10. Weatherstripping

Accurate Metal Weather Strip Co., Inc.	A 33

ALBERENE STONE CORPORATION OF VIRGINIA

Quarriers and Fabricators of Alberene Soapstone and Serpentine

419 Fourth Avenue, New York 16, N. Y.
Quarries and Mills at Schuyler, Va.

ALBERENE SOAPSTONE

Alberene Soapstone is a natural quarried stone of medium hardness, having an abrasive hardness factor of ±6. Its blue-gray color harmonizes well with any decorative pattern, and its durable, moisture-proof surface does not chip, scale, or split. Alberene Soapstone is easily machined—drilled, slotted, grooved, or tongued—without splitting or spalling. Its ability to be cut into thin sections makes for definite economies.

Interior Uses	*Exterior Uses*	
Stair strings and risers	**Mullions**	**Bulkheads**
Base and border	**Spandrels**	**Facing**
Window stools	**Window sills**	**Coping**

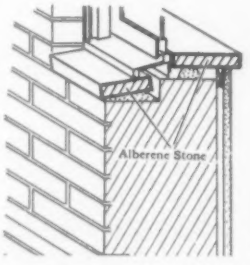
Interior Uses	*Exterior Uses*
Window stools	**Mullions and spandrels**
Toilet partitions	**Window sills and coping**

ALBERENE SERPENTINE

Alberene Serpentine is especially desirable for exterior use where a dark stone is required, because of its great resistance to weather action and excellent retention of polish. It takes a high polish, which is definitely black. In a rubbed finish it is gray and in a honed finish, bluish black. It is exceedingly dense, fine grained, homogeneous in structure and free of cleavage planes. When machine tooled, it will hold a sharp arris. It is tough as distinguished from brittle. Its abrasive resistance (Ha value) is 35-45. Its ability to be cut into thin sections (⅞", 1¼" are normal) makes for definite economies.

ALBERENE STONE SILLS AND STOOLS

Both Alberene Soapstone and Alberene Serpentine are ideally suited for window sills and stools. Both stones are weather-resistant and free of maintenance cost. They have no cleavage planes, are dense, non-absorbent, *and chemically resistant*. Color of Regular Grade is silver gray in rubbed finish and a pleasing blue gray when honed—harmonizes well with almost any color scheme. Where a darker color is desired, we suggest Alberene Serpentine. It is a darker gray in rubbed finish, blue black when honed, and black with a very slight greenish cast when polished. For exterior sills where abrasion resistance is not a major factor, we recommend Regular Grade. For interior stools, we recommend Serpentine because of its higher abrasion resistance and more attractive finish.





Typical architectural use of Alberene Stone—window mullions and facing in a modern school building

LACLEDE STEEL COMPANY

St. Louis, Missouri



Unique use of LACLEDE STEEL JOISTS

saves building time and cost for new Missouri high school

PACIFIC HIGH SCHOOL
Pacific, Mo.

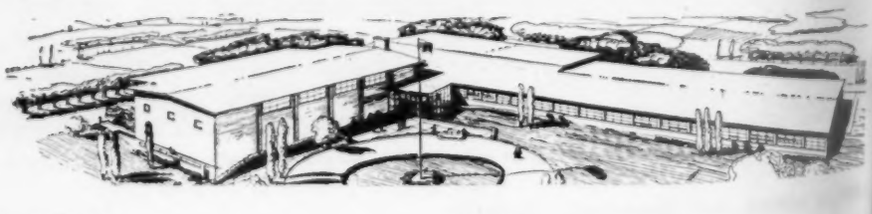
Contractor:
Juengel Construction Co., St. Louis

Architect:
Charles Lorenz, Kirkwood, Mo.

The new Pacific High School provides an excellent demonstration of the versatility of Laclede Straight Chord Steel Joists and their adaptability to specific architectural requirements.

By using two single joists with cantilever extended ends on each side of a three bay roof design, the number of joists required on the project was reduced by one-third and substantial saving resulted in material, time and labor.

Other Laclede Steels, too, including Multi-Rib Reinforcing Bars and Welded Wire Fabric, were used in this modern new building.



MACOMBER INCORPORATED

1923 Tenth St., N. E., Canton 1, Ohio

V-LOK Designs Readily Into School Layouts, Gets a School Under Roof Faster and Reduces Erection Costs

For The School Building Committee Seeking Additional Facilities

A school designed with a V-LOK Steel Frame can be erected and under roof in a very few days—using a minimum of skilled labor and equipment to expense against the job. Interlocking structural members require no bolting, riveting or welding.

GET THIS CATALOG!
Forty pages of details

NAILABLE STEEL JOISTS
•
LONGSPANS
•
BOWSTRING ROOF TRUSSES
•
METAL DECK
•
V-LOK STEEL FRAMING
•
STRUCTURALS

We state a fact—Investigate V-LOK—its speed and economies — and for all future buildings you will insist upon V-LOK Framing.



Reduction of weight per square foot and cost of erection per square foot for the entire structural frame.

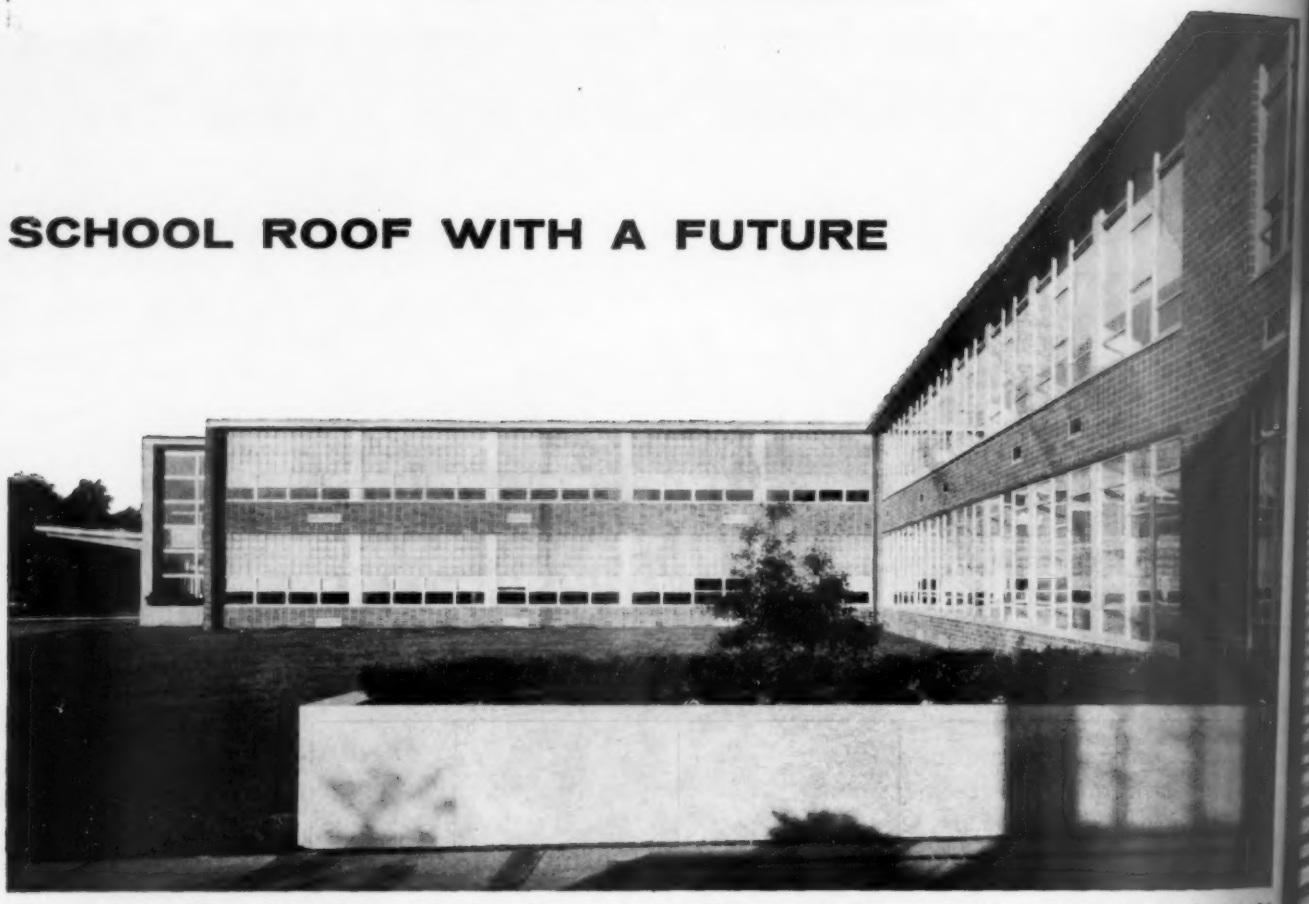
GREATEST ADVANCEMENT IN FIFTY YEARS OF STEEL CONSTRUCTION

BARRETT DIVISION

ALLIED CHEMICAL & DYE CORPORATION

40 Rector Street, New York 6, N. Y.

SCHOOL ROOF WITH A FUTURE



Wheaton High School, Wheaton, Maryland—protected by a Barrett Roof. Architect: Ronald Sanseman, Washington, D. C. Roofer: Warren-Ehret Co., Washington, D.C.

The people who planned the building of this beautiful high school looked to the future. They wanted to be sure of an educational plant that would give them years of efficient service at minimum maintenance costs.

That is why they chose to have their school protected by a Barrett Roof.

Barrett Roofs are built up in successive layers of premium-quality pitch and felt, surfaced with slag, gravel or tile to provide fire-safe, long-enduring armor against all kinds of weather.

Let Barrett's unmatched experience in roofing guide you in the selection of the right materials and application methods for *your* school's roof. The result will be a roof guaranteed for 15 or 20 years against leaks caused by ordinary wear and tear by the elements. And a Barrett Specification* Roof usually gives many additional years of trouble-free wear after the expiration of the bond!

For a thorough analysis of your school roofing problem and expert recommendations for its solution, we suggest that you contact your Barrett Roofer today . . . or write or telephone us direct.

Barrett®

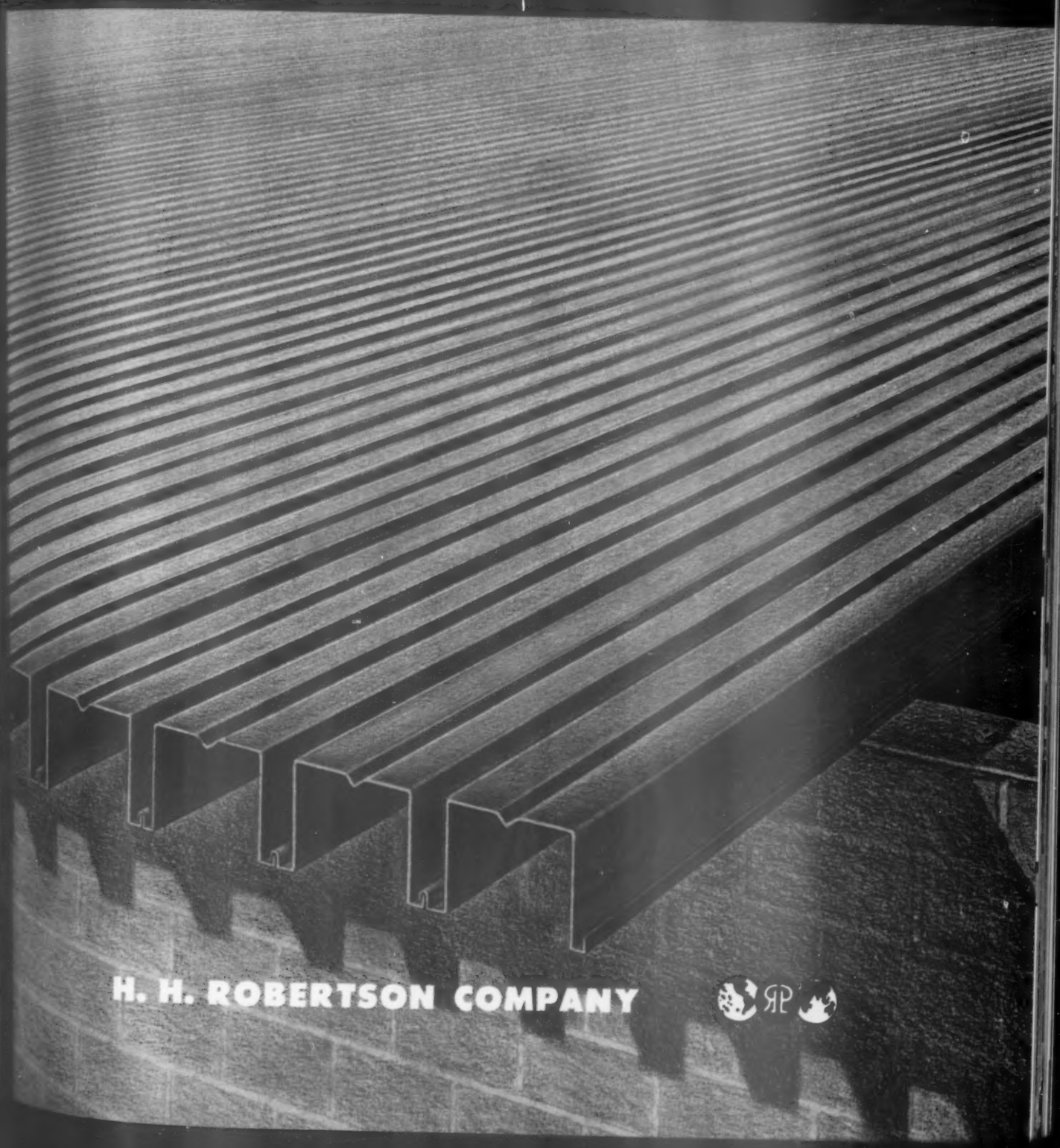
BARRETT ROOFS

BARRETT DIVISION, Allied Chemical & Dye Corporation
40 Rector Street, New York 6, N. Y. Hanover 2-7300

*Reg. U. S. Pat. Off.

FOR OVER 100 YEARS THE GREATEST NAME IN ROOFING

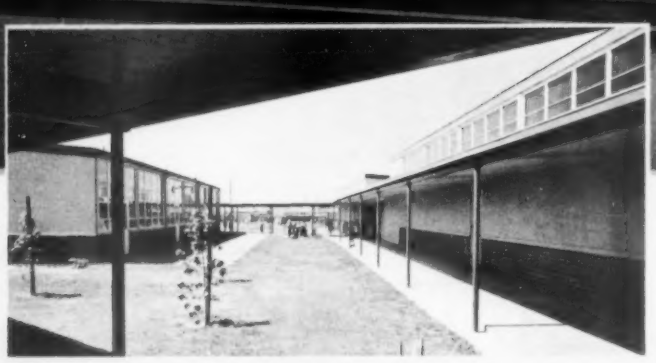
LONG SPAN



H. H. ROBERTSON COMPANY

Now





Schools: New Long-Span Q-Deck greatly simplifies the design of covered walkways and cantilevered canopies in modern schools, as well as allowing corridors to be included in the same span with classrooms.



Supermarkets: As in the case of schools, much greater latitude of design is allowed by increasing deck span. Considerable saving in structural steel is made possible, and time and labor are cut down in the erection of the deck.

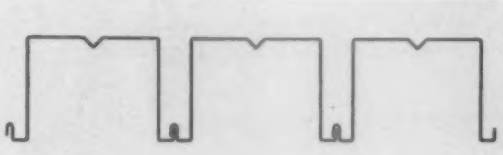
A-1/RO

Span 32 Feet

with Robertson Long-Span Q-Deck

After considerable testing and research, H. H. Robertson Company is pleased to announce the availability of a new product much needed in modern lightweight construction—a deck which will span greater distances without loss of load-carrying capacity. New Long-Span Q-Deck, now being manufactured in quantity for the first time, carries with it all the basic quality and advantages of Robertson's famous Standard Q-Deck. Side laps become standing seams and are mechanically fastened at regular intervals for structural stability. Units are easy to handle and erect with a minimum crew. They install quickly and tightly because of precision manufacture. Long-Span Q-Deck is best adapted for use in schools, supermarkets and other building types where longer single spans indicate positive economies. Use the coupon to write for literature concerning this new Robertson product.

Individual units are 12″ wide by 7½″ high rolled from metal-coated steel in 18, 16, 14 and 12 U.S. Gage.



See back page for other Robertson Roof Decks



H. H. Robertson Company
2400 Farmers Bank Building · Pittsburgh 22, Pa.
In Canada: Robertson-Irwin Ltd., Hamilton, Ontario
In England: Robertson Thain Ltd., Ellesmere Port, Cheshire
Offices in All Principal Cities — World-Wide Building Service

Please send free information on Long-Span Q-Deck.

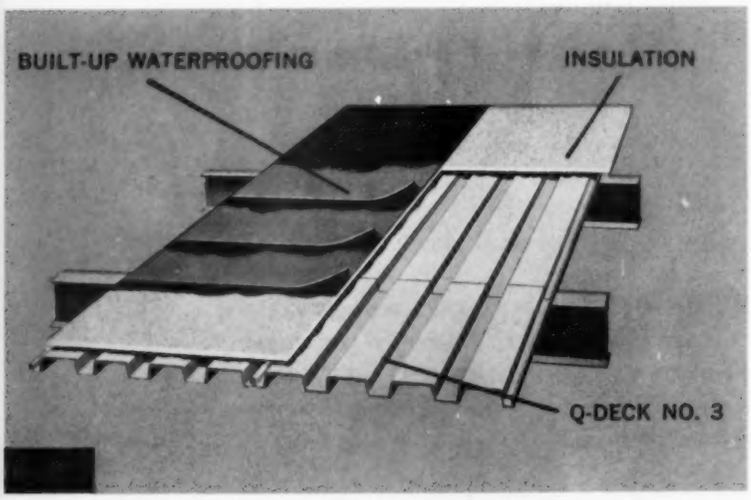
NAME _____ TITLE _____

FIRM _____

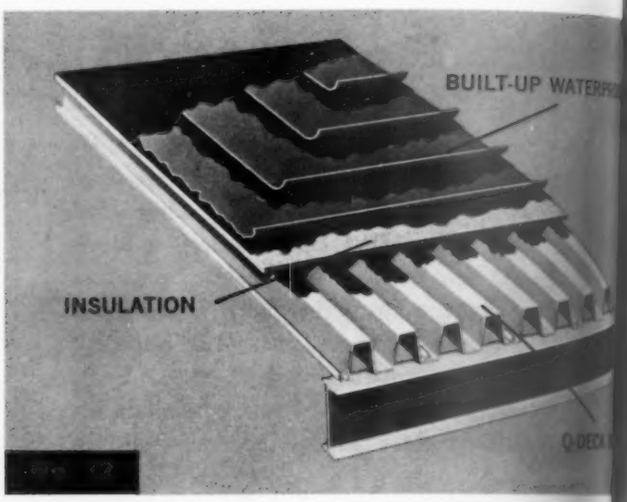
ADDRESS _____ CITY _____

[redacted] roof deck

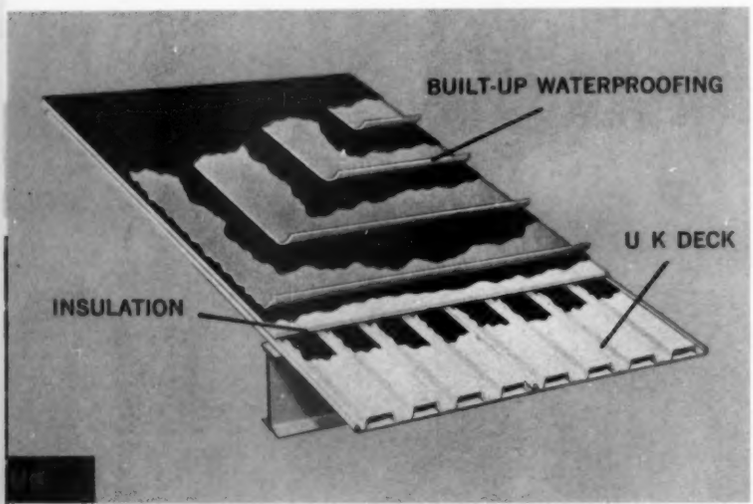
. . . designed to suit any load or span requirement.



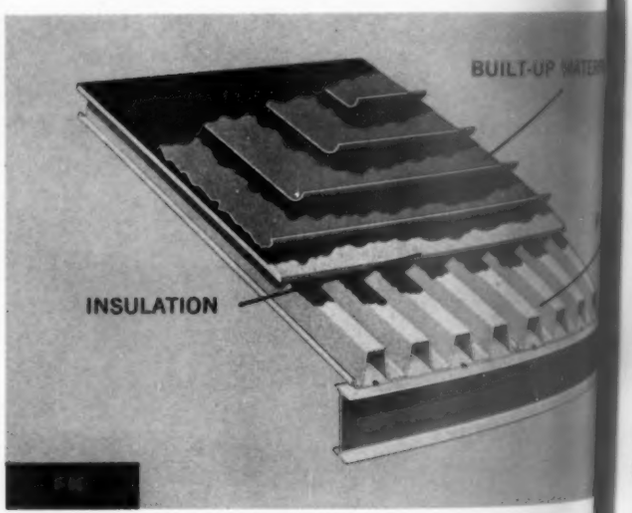
Economical for short spans (up to 10 ft.) carrying normal roof loads. Width: 2 ft., maximum length: 30 ft. in metallic coated steel, 18 ga. or heavier and 20 ft. for 20 ga. 11′-10″ in Galbestos.



A long span unit economical for normal roof loads on [redacted] over 10 ft. Width: 1 ft., maximum length: 25 ft. in [redacted] coated steel. Available in metallic coated steel only.



For spans up to 12 ft., offers fluted or flat ceiling. Cells can be used for electrical raceways. Units are 2 ft. wide; maximum length 30 ft. Available in metallic coated steel only.



Economical for spans up to 20 ft., with flat or fluted [redacted] Cells can be used for electrical raceways. Units are 2 ft. [redacted] maximum length 30 ft. Available in metallic coated steel [redacted]

H. H. ROBERTSON COMPANY

2400 Farmers Bank Building Pittsburgh 22, Pennsylvania

World Wide Building Service

In England—Robertson Thain Limited, Ellesmere Port, Cheshire

In Canada—Robertson-Irwin Limited, Hamilton, Ontario

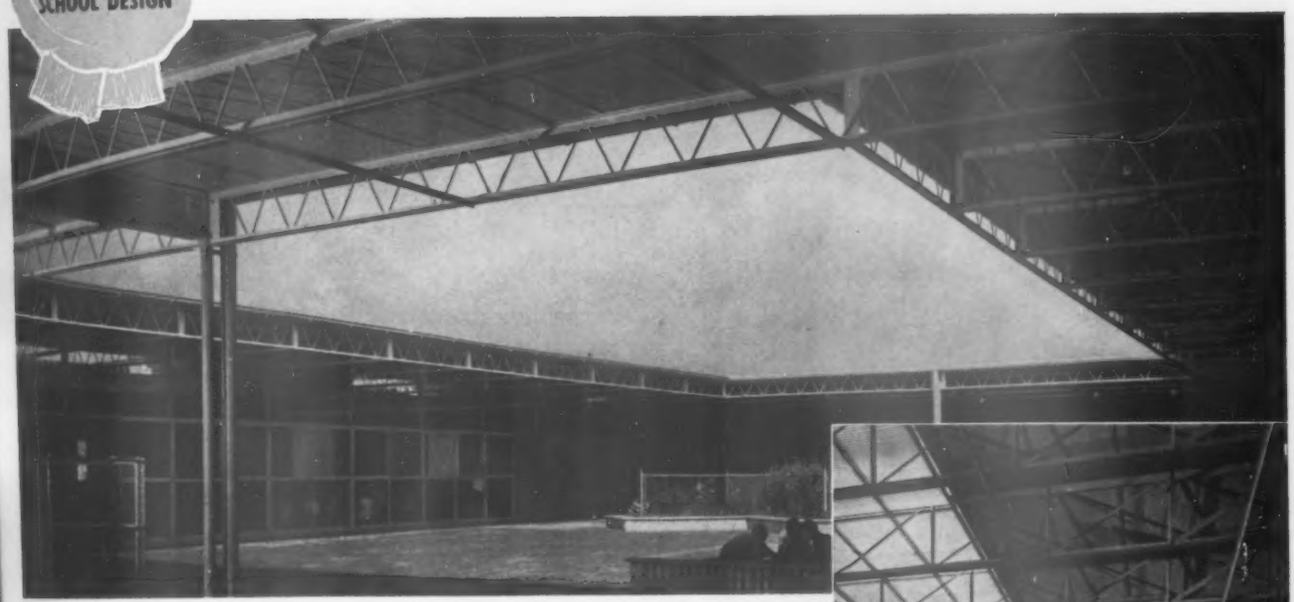
Litho in U.S.A.

S. K. INSULROCK CORPORATION

Linden, N. J.

WINNER THE SCHOOL EXECUTIVE 1952 Competition FOR BETTER SCHOOL DESIGN

INSULROCK ACOUSTICAL INSULATING ROOF DECK





West Columbia (Texas) Elementary School, Donald Barthelme, Architect
The photographs above and to the right show how Insulrock roof slabs were used in the prize-winning West Columbia School.

INSULROCK roof slabs provide in a single material, an incombustible roof deck having a high thermal insulation, and sound absorption. It is suitable for many types of school buildings such as gymnasiums, auditoriums, field houses.

NEW IMPROVED OFF-WHITE FINISH provides a light reflection of 55%—83% light reflection can be obtained with one spray coat of paint.

INSULROCK is composed of tough, long, chemically-treated wood fibers which are completely coated with fire-resisting and water-resisting portland cement and bonded together under substantial pressure to form strong, durable, incombustible slabs.

ADVANTAGES

- incombustibility
- insulating value
- sound absorption
- structural strength
- durability
- stability
- ease of sawing and nailing
- low labor installation cost

SK INSULROCK

Noise reduction coefficient of .80 to .85

Insulating U factor of .18 to .12

RILCO LAMINATED PRODUCTS, INC.

2522 First National Bank Building, St. Paul 1, Minnesota



Because Rilco glued-laminated arches are factory cut and finished, they can be erected quickly by the regular contractor crew at the building site. They save time and labor.



This Elementary School gymnasium, Gladstone, Minnesota, illustrates the dramatic beauty of wood and the clean, graceful lines of Rilco arches. They provide 100% usable floor space with no overhead obstructions.

Architects: Ingemann and Bergstedt, St. Paul, Minnesota



Here Rilco beams add the warm richness of wood, yet the cost is low. This pleasant classroom is in the Goodhue County School, Vasa, Minnesota.

Architect: Max and Gerald Buetow, St. Paul, Minnesota

How your new school can look better ...and cost less

For modern schools, gymnasiums and auditoriums, Rilco structural members combine structural strength with the richness and beauty of wood. Rilco laminated structural members are at their best when left exposed, for they provide a highly decorative, warm, friendly appearance. The luxury of wood is actually inexpensive with Rilco construction because erection costs are remarkably low

What are Rilco Structural Members?

Rilco manufactures beams, columns and arches for school buildings; and arches, trusses and other framing members for gymnasiums, auditoriums and similar buildings where clear-span construction is desired. These Rilco structural members are built up from selected, kiln-dried Douglas Fir laminations, bonded together under pressure by modern structural glues. Each structural member is designed for its job by Rilco's own engineering department. Laminated wood structural members, being of relatively large cross section, are slow to burn. They do not quickly lose their strength under high temperatures. A wood structure doesn't collapse, it holds until the cross section is actually reduced to the breaking point by steady flame. It allows *time* very often time enough to save the structure and contents.

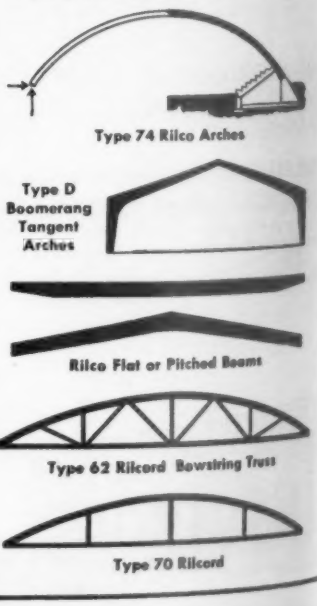
How Rilco Structural Members add beauty

Rilco members take advantage of the inherent beauty of wood. They are graceful in shape and add to the appearance of a building. Members can be factory finished . . sanded, coated with wood sealer and wrapped for protection in shipping.

How Rilco Structural Members save money

If you are planning a school building project, consider the advantages of Rilco structural members . . the dramatic beauty of wood, the strength and permanence of glued-laminated construction, and the greatly reduced labor costs. Rilco has a complete engineering staff and field representatives to give technical assistance on each job. And Rilco's expanded production facilities assure prompt delivery. Write for our free catalog or if you prefer, we'll be glad to have our experienced field representative call to discuss your building requirements.

BASIC SHAPES OF RILCO GLUED-LAMINATED STRUCTURAL MEMBERS

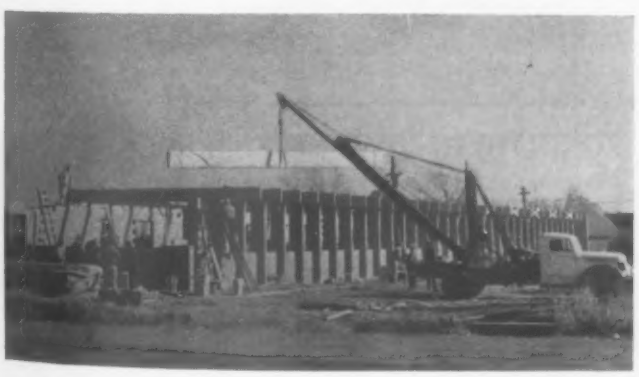


ARCHITECTS: SMITH & VOORHEES, DES MOINES, IOWA



CONTRACTOR: HURLEY CONSTRUCTION CO., ST. PAUL, MINN.

"The cost advantage of the laminated wood," says Grant Voorhees, "was the deciding factor in its selection. We found by using glued laminated wood structural members a very appreciable savings in the cost of the schools was effected. Of course, the beauty of the natural materials when left exposed added greatly to the pleasing, informal atmosphere which we consider so essential in today's elementary schools."



For the modern school design that calls for economical construction and beauty, the architect who specifies Rilco achieves an attractive and structurally sound building at lowest cost. Rilco structural members offer the architect freedom of design with simple yet effective construction in a fire-resistant material. Rilco's service engineers will be pleased to consult with you about your requirements. Write for information or see our catalog (2B/Ri) in Sweets.

MODERN SCHOOL DESIGN SAVES $500 PER ROOM

Smith and Voorhees specified glued laminated wood structural members for the Webster Grade School at Pella, Iowa and the West Side Grade School at Eagle Grove, Iowa. Cost comparison showed a savings of $500 per schoolroom over other types of construction materials.



Contractors find they can give lower bids when Rilco glued laminated wood is specified. Gene Hurley, contractor of both jobs says, "Rilco really cut erection costs. The beams arrived on the job ready for erection. No specialized crews were necessary; the carpenters did all the erection easily with the connectors furnished by Rilco. There was no furring, we just nailed the Rilco decking to the top of the beams and purlins."

RILCO
works wonders with wood

RILCO LAMINATED PRODUCTS, INC.

2522 FIRST NATIONAL BANK BLDG., ST. PAUL 1, MINN.

District offices: Wilkes-Barre, Pa.; Fort Wayne, Ind.; Manhattan, Kansas; Tacoma, Wash.

ZONOLITE BRAND VERMICULITE

ZONOLITE COMPANY

General Offices: 135 South La Salle St., Chicago 3, Illinois

40 processing plants throughout the U.S.A. and Canada

PRODUCTS FOR *FIRESAFE* SCHOOLS!

They Combine Insulation, Fire Safety, Lightweight, Permanence.

ZONOLITE PLASTER AGGREGATE

Zonolite vermiculite products during the past few years have made it possible to build firesafe, well insulated buildings at less cost. Many schools ravaged by fire might have been saved if the flames had been confined. Zonolite Plaster provides this protection—attains highest possible fire ratings. Easy to decorate; provides an attractive, permanent interior finish. Write for folder PA-2.

Check These Outstanding Features

Uniform—Zonolite Plaster Aggregate is standard material that meets rigid specifications wherever purchased.
Firesafe—Achieves the highest possible fire ratings, blocks spread of flames.
Added Insulation—Provides plus insulation in walls and ceilings.
Lightweight—Weighs about 216 lbs. per cubic yard. An equal volume of sand weighs over 10 times as much!

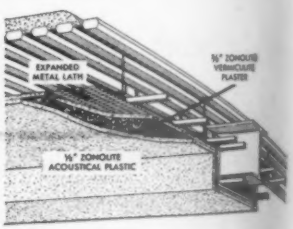
★

ZONOLITE ACOUSTICAL PLASTIC

In classrooms, auditoriums and lecture halls Zonolite Acoustical Plastic sound conditions effectively, attractively. No other acoustical material offers greater fire safety. Protects underlying combustible materials. Can be applied to curved or irregular surfaces; covers any clean, firm surface; various attractive textures obtainable. Machine application permits widespread use of acoustical treatment at low cost. Write for folder PA-5.

4-HOUR FIRE-RATING

Zonolite Acoustical Plastic ceiling combines maximum fire safety with 0.65 noise reduction. Costs little more than conventional 3-coat plastering.



★

ZONOLITE INSULATING CONCRETE

Zonolite Stabilized Concrete Aggregate gives the ideal roof or floor insulation. Fireproof, rotproof, verminproof. When Zonolite replaces sand and gravel in a concrete mix, the result is an extremely lightweight insulating concrete used for roof decks, roof insulation, cavity wall fills, insulating floors on ground. Send for booklets CA-2, CA-4.

INSULATING CONCRETE'S ADVANTAGES

- **High insulation.** 1″ insulates as well as 12″ to 16″ or ordinary concrete.
- **Lightweight.** Only 25-45 lbs. per cubic foot, depending on the mix.
- **Easy mixing** and application.
- **Permanent** as the earth itself. Zonolite insulating concrete lasts the life of the school.

★

New Zonolite Vermiculite Sand Concrete

Provides: Lightweight fill over structural metal or concrete floors; ideal base for tile, linoleum, etc.

- Approximately 4½ times the insulating value of ordinary concrete.
- No topping necessary. Asphalt, ceramic tile, carpeting can be laid directly on surface.
- Resilience approaches wood. And floor temperatures more nearly approach room temperatures with vermiculite-sand concrete.

★

ZONOLITE INSULATING FILL

In new buildings or in remodeling where there is great heat loss, Zonolite Insulating Fill is an effective answer. Doubly efficient with dead-air cells plus reflective surfaces. Inorganic, will not rot. 100% fireproof. Its added benefits often *cost less*. Write for folder HI-48.



★



2 MORE FIRESAFE MEMBERS OF ZONOLITE FAMILY

INSULPAVE Insulpave is made of fireproof, rotproof vermiculite granules coated with special type asphalt. Makes a flexible mat for roof or floor insulation. Economically made on the job; can be poured in any weather. Send for folder G-55.

ZONATILE A new lightweight roof slab for installation over sub-purlins or structural members. Combines insulation and structural strength. Does the whole job in one application. Underside makes an attractive ceiling. Write for folder G-50.

PITTSBURGH CORNING CORPORATION

Dept. ANG-55, One Gateway Center, Pittsburgh 22, Pa.

Here's better daylighting and good looks ...with PC Glass Blocks





When you **build**

Consult with your architect on the advantages of including PC Glass Blocks in the new buildings you may be planning.





When you **modernize**

If your plans include remodeling old buildings, you'll do well to modernize the window areas by installing PC Glass Blocks.

PC Functional Glass Blocks diffuse and distribute valuable daylight to all areas of the room and there are patterns available to solve every daylighting problem. Panels of PC Glass Blocks impart clean, architectural lines to new buildings, and give a decided lift to the appearance of older structures.

Maintenance costs are kept to a minimum as PC Glass Blocks only have to be cleaned once or twice a year, breakage is practically non-existent and there is no sash to require painting or reputtying. Further savings can be made by the reduced need for window blinds, shades or louvres.

PC Glass Blocks will save plenty of money on operating costs, too. As an example, they have high insulating value (equal to an 8-inch masonry wall) so they reduce fuel costs drastically. For more information, write to Pittsburgh Corning Corporation, Dept. ANG-55.

PC Glass Blocks

PITTSBURGH PC CORNING

ALSO SKYTROL® AND FOAMGLAS®

In Canada: 57 Bloor St. W., Toronto, Ontario

See our advertisement on page A22 for information on PC Skytrol Glass Blocks for toplighting.

KIMBLE GLASS COMPANY
SUBSIDIARY OF OWENS-ILLINOIS
Toledo 1, Ohio

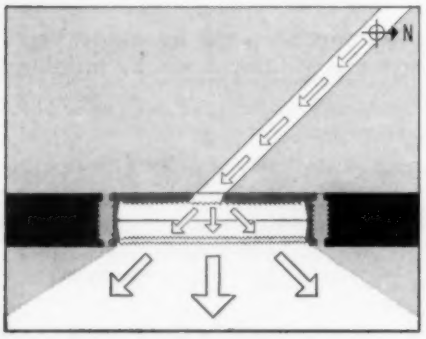
Glass panels bring cool daylight in through the roof

Light-Selective Toplite Roof Panels transmit desirable light; reject hot, glaring sun

NO LONGER is it necessary to confine close detail work to the area nearest the windows. Toplite Roof Panels permit daylighting of all building areas regardless of location or distance from exterior walls. Toplite Panels may be installed in continuous strip, pattern, or in individual panels. Use a Toplite panel as you do a lighting fixture.

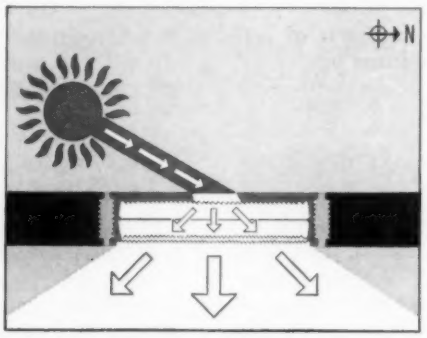


Toplite installation at Campus Elementary School, New Jersey State Teachers College at Glassboro—Glassboro, New Jersey. Dr. Thomas Robinson, President. Edwards and Green, Camden, N. J., Architects. S. Levy & Company, Camden, N. J., General Contractor.



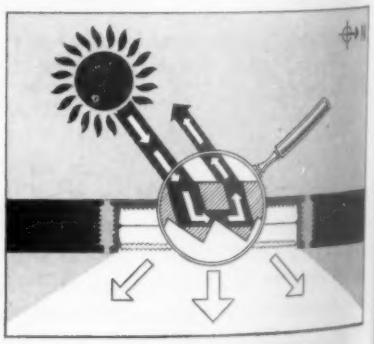
Transmits north light

Maximum transmission of north light is a desirable quality in toplighting because of its uniformity and freedom from glare and solar heat. Note how the prism structure of Toplite affords efficient transmission of north light.



Accepts winter sun

Since low winter sun is comparatively weak in relation to high summer sun as far as glare and solar heat are concerned, maximum transmission is again desirable. This illustration shows how Toplite accepts and transmits winter sunlight.



Rejects summer sun

Other materials which transmit north light and low winter sun also transmit high percentages of light during the hot, summer months. Toplite rejects direct light and heat from hot, summer sun, but transmits much of the cool, north light.

KIMBLE GLASS COMPANY

Owens-Illinois Glass Block* mean good daylighting . . . lower maintenance

Northeastern University, Boston, Massachusetts. Shepley, Bulfinch, Richardson and Abbott, Architects.

. . . in new schools



Panels of Owens-Illinois light-directing Glass Block provide even distribution of daylight throughout the gymnasium area. They eliminate "hot spots," glare and harsh contrasts.



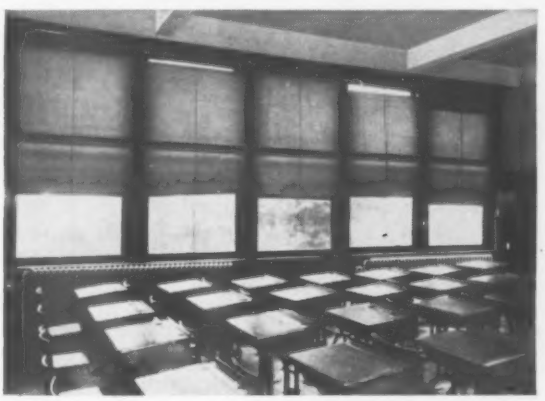
The insulating efficiency of glass block makes designs like this possible. Glass block permit use of large glass areas without excessive heat loss in the sides and front of the gymnasium.

Here is a school that makes maximum use of free daylight . . . is easier to heat in winter . . . is easier to maintain. The reason? Panels of Owens-Illinois light-directing Glass Block.

Great use of natural lighting has been made part of the building plan. With panels of Owens-Illinois Glass Block, daylight is directed upward and diffused over all parts of the schoolroom all day long. The combination of light-directing glass block and vision strip keep brightness at comfortable levels, provide vision and ventilation. Excessive glare and harsh contrasts are eliminated. Because glass block insulate so efficiently heating costs are cut.

**Formerly known as INSULUX*

. . . in old schools



OLD windows needed constant, expensive maintenance . . . did not provide healthful daylighting throughout the school's classrooms.



NEW panels of Owens-Illinois Glass Block insulate so efficiently and daylight so effectively, heating and lighting costs are cut.

Here is a school that solved the problem of worn-out window sash. Continual, expensive maintenance of the old sash did not provide protection from wintry blasts. After sash were replaced with Owens-Illinois light-directing Glass Block maintenance costs are practically eliminated. Glass block won't rust or rot . . . are hard to break.

If you are in the process of remodeling old structures, or building new ones, don't overlook the positive advantages —maintenance economies; better seeing conditions—that panels of glass block bring. For complete information write Kimble Glass Company, subsidiary of Owens-Illinois, Department AU5, Toledo 1, Ohio.

GLASS BLOCK AND TOPLITE PANELS
TWO (O) PRODUCTS

OWENS-ILLINOIS
GENERAL OFFICES • TOLEDO 1, OHIO

PITTSBURGH CORNING CORPORATION

Dept. ANS-55, One Gateway Center, Pittsburgh 22, Pa.

Now... a special PC Glass Block for toplighting



PC FUNCTIONAL GLASS BLOCKS do a fine job of daylighting in standard classrooms. But lately, many schools have been designed with classrooms that are deeper and lower than ever before. This may reduce building costs, but it intensifies the daylighting problem.

PC Skytrol toplighting panels in the *roof* will balance the daylight throughout the room and give adequate daylighting to students even on the inside row. Skytrol panels not only provide good daylight, but they will not "sweat" and drip moisture like conventional skylights.

Your architect can discuss with you how low-cost panels of Skytrol blocks can be designed and built into your new building. Assembled into strong, reinforced concrete panels, these blocks have an insulating value equal to an 8-inch masonry wall. Thus, heat loss is held to a minimum. Skytrol blocks are also ideal for daylighting corridors, cafeterias, gyms, libraries, etc.

For more information on PC Glass Blocks or Skytrol Blocks, write Pittsburgh Corning Corporation, Dept. ANS-55, One Gateway Center, Pittsburgh 22, Pa.

See our advertisement on page A19 for additional information on PC Glass Blocks.



SKYTROL* GLASS BLOCKS

ALSO PC GLASS BLOCKS AND FOAMGLAS®

PITTSBURGH PC CORNING ®

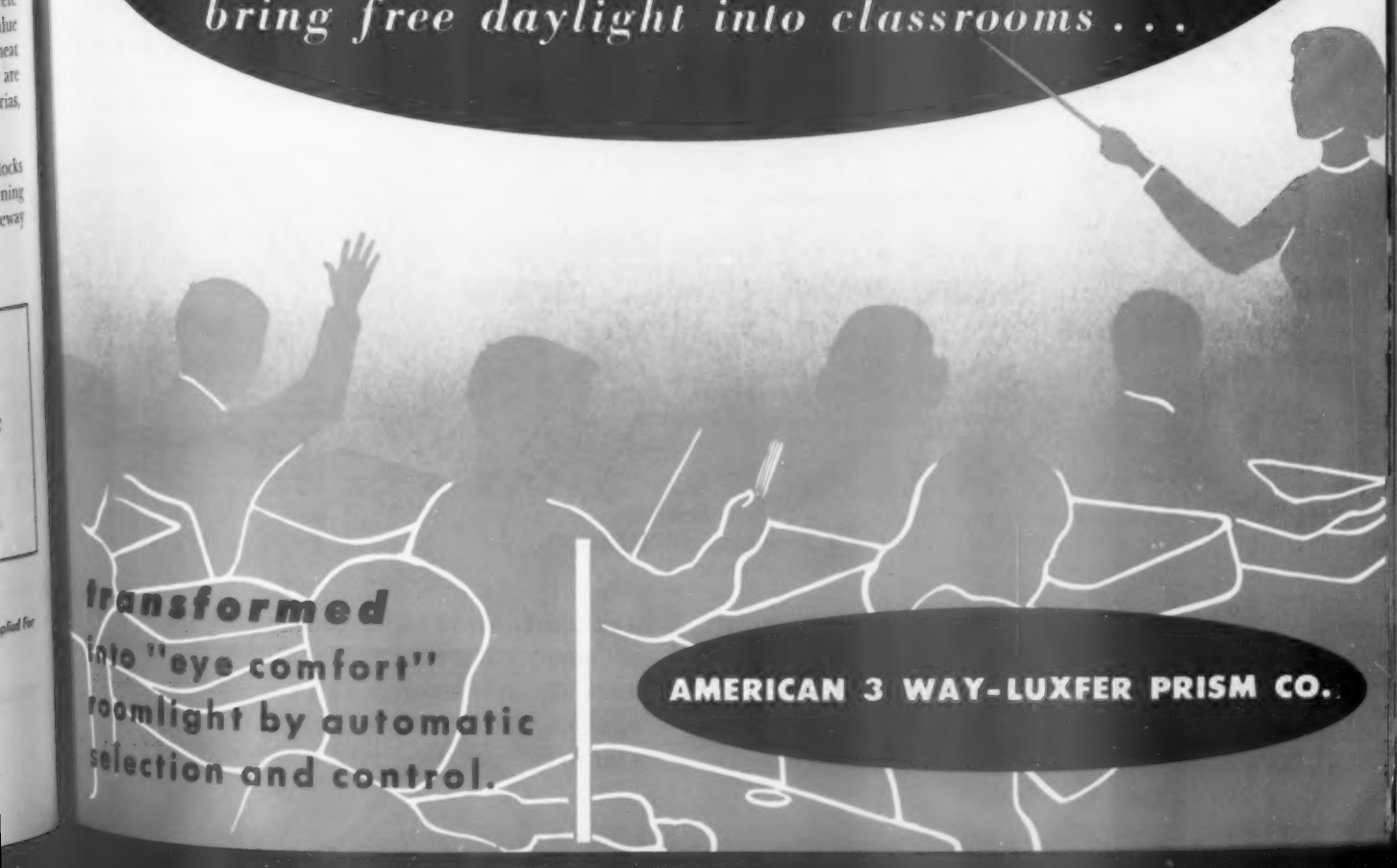
In Canada: 57 Bloor St. W., Toronto, Ontario

*T. M. Reg. Applied for



American 3 Way
TOP·LIGHTS

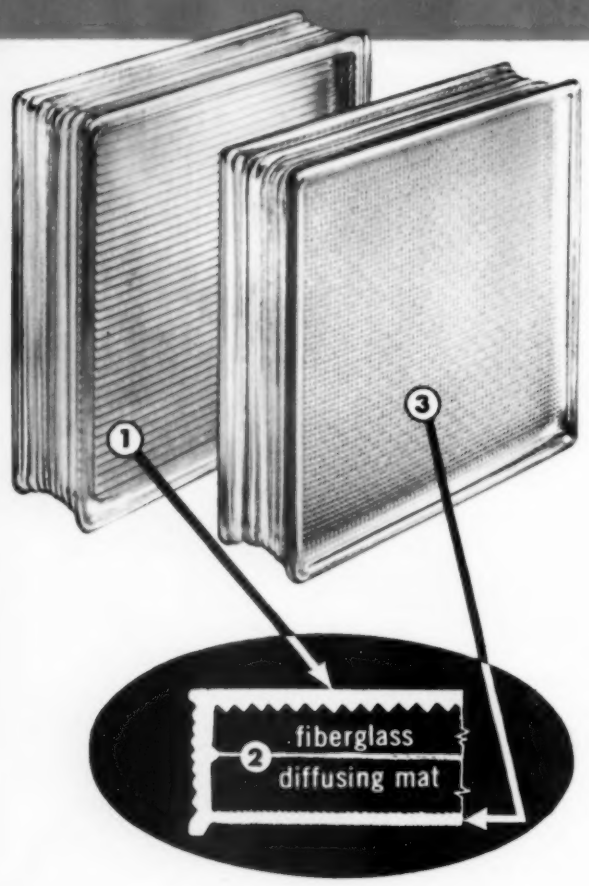
bring free daylight into classrooms . . .



transformed
into "eye comfort"
roomlight by automatic
selection and control.

AMERICAN 3 WAY-LUXFER PRISM CO.

. . . more than a mere diffuser!



TOP • LIGHT glass blocks perform the additional function of light selection and control

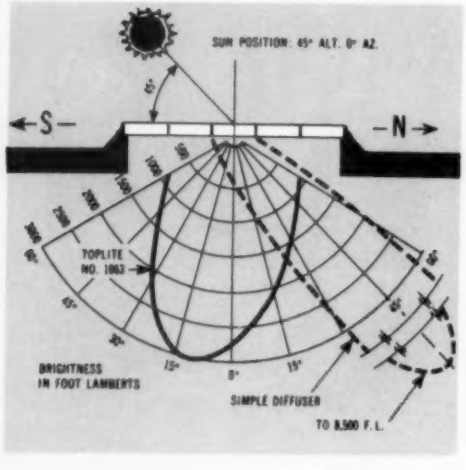
The first function of TOP•LIGHTS — selection and control of light as it enters — is peculiar only to these unique glass blocks. The grooves on the under side of the block top plate (1) serve as a sort of traffic director for the various types of daylight that fall on it. Uniform, reflected *north light* is given unrestricted passage. Hot, overbright summer sunlight is mostly rejected. The winter sunlight, from low in the southern sky, also has free passage. Secondly, TOP•LIGHTS direct the light downward, regardless of the direction of the sunlight, eliminating traveling "bright spots" as may appear under ordinary diffusers as the sun travels from east to west.

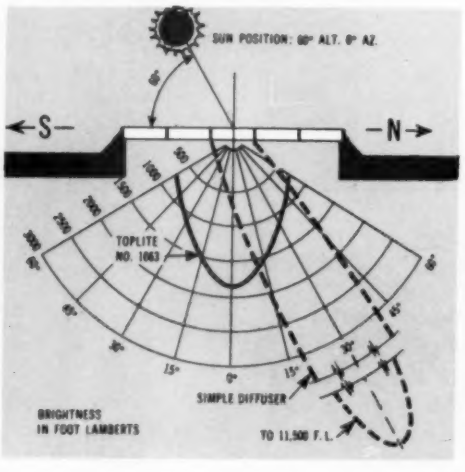
The fibrous glass (2) sealed in the center of the block, together with the waffle-patterned bottom side (3), diffuse and spread the light into one, uniform downward flood of soft roomlight.

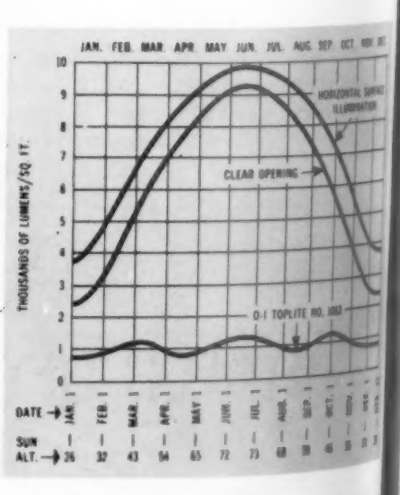
The hollow spaces on either side of the fibrous glass mat in the center of the block form dead air spaces of heat insulating qualities.

For areas such as stairwells, corridors, gymnasiums, etc., where maximum light transmission is important, special TOP•BRITE blocks can be specified.

graphic evidence of TOP•LIGHT'S superior performance over ordinary diffusers . . .



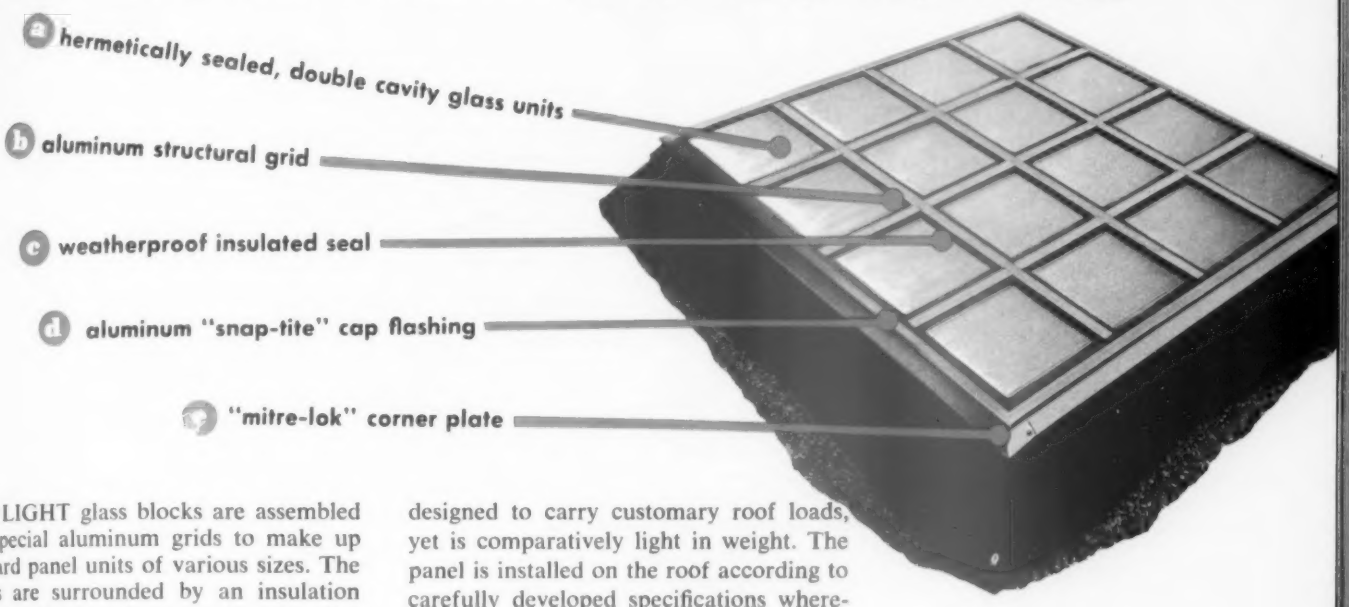




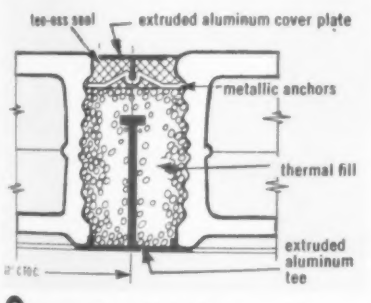
These comparative performance charts, above left, clearly demonstrate the difference in the brightness distribution and directional control of light. All daylight is well diffused by TOP•LIGHTS without any intense beam of light in any direction at any time of day.

The chart, above right, demonstrates the surprising uniformity achieved by TOP•LIGHTS the *year round*, especially as compared with clear plastic and glass openings and horizontal surface illumination. These year round tests were taken at high noon.

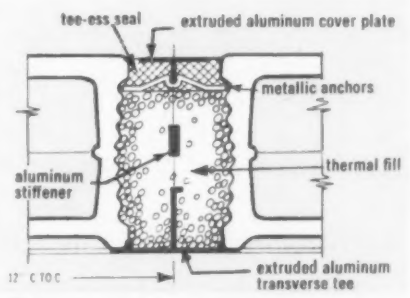
American 3 Way TOP·LIGHTS are factory built into insulated, pre-assembled grid panels . . . easily and quickly installed



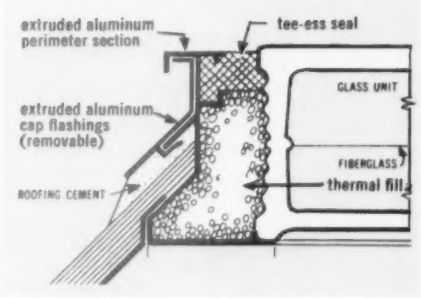
TOP•LIGHT glass blocks are assembled into special aluminum grids to make up standard panel units of various sizes. The blocks are surrounded by an insulation fill properly treated, covered and sealed with Tee-Ess compound for protection and weatherproofing. The sealed grid is designed to carry customary roof loads, yet is comparatively light in weight. The panel is installed on the roof according to carefully developed specifications whereby one end of the panel is oriented northward within a rotation of 30°.



A cross section of joint between blocks viewed from north-south ends

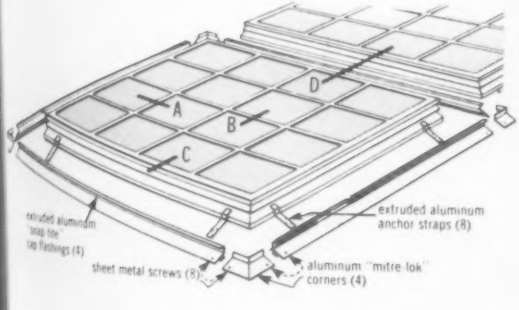


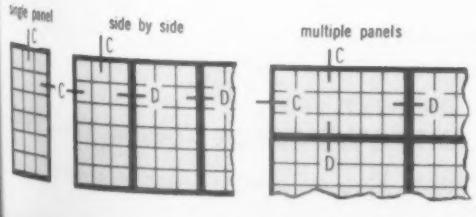
B cross section of joint between blocks viewed from east-west ends



C cross section of grid perimeter showing the flashing

STANDARD PANEL ASSEMBLIES are readily available complete with accessories and installation instructions.





The diagram illustrates the accessories, their relative position and quantity of each part. Each panel is labeled with step by step installation instructions for the contractor, including (1) direction of north, (2) direction of structural members and (3) code numbers.

For lower cost and quicker delivery, standard sizes should be ordered whenever possible. Special sizes can be built up to 22 square feet or up to 6′ 2″ in any one direction.

Large TOP•LIGHT areas can be achieved by placing standard panels side by side and/or end to end. Necessary expansion strip and insulating cover plate will be furnished complete with construction details when multiple paneling is specified.

STANDARD SIZES

CODE NO.	SKETCH	DIMENSIONS	THIS ARROW TO THE NORTH	DIRECTION OF STRUCTURAL MEMBERS	APPROX. WEIGHT, LBS.	LBS. PER SQ. FOOT
33 NS		3′-2″ x 3′-2″	↑	↕	175	20
44 NS		4′-2″ x 4′-2″	↑	↕	298	34
36 NS		3′-2″ x 6′-2″	↑	↕	334	38
45 NS		4′-2″ x 5′-2″	↑	↕	378	43
54 NS		5′-2″ x 4′-2″	↑	↕	378	43
33 EW		3′-2″ x 3′-2″	↑	↔	175	20
44 EW		4′-2″ x 4′-2″	↑	↔	298	34
63 EW		6′-2″ x 3′-2″	↑	↔	334	38
45 EW		4′-2″ x 5′-2″	↑	↔	378	43
54 EW		5′-2″ x 4′-2″	↑	↔	378	43

natural color and cheerful environment improve student efficiency

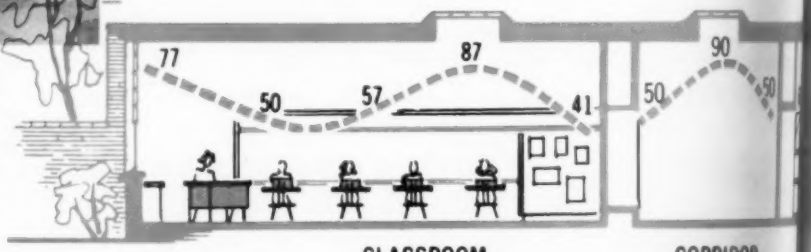


The value of TOP•LIGHT'S natural, uniform lighting is demonstrated in this classroom photo. Every part of the room is uniformly lighted so that even the smaller objects are quite easy to distinguish. Note the absence of glare spots.

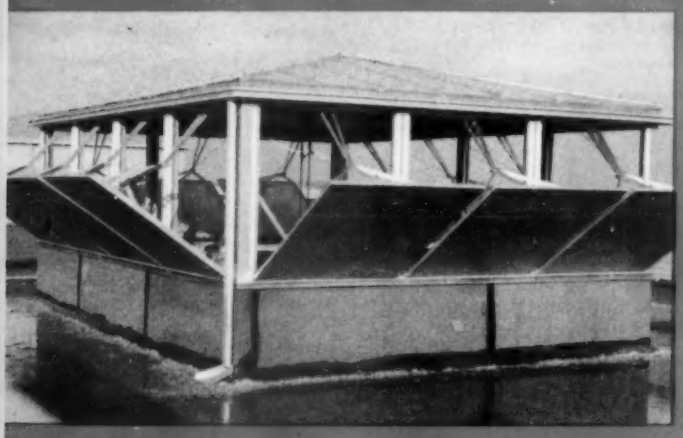
Westchester Hills School, Yonkers, New York. STARRETT, VAN VLEEK and REGINALD E. MARSH, Architects; H. C. SNYDER, Associate, New York

The distraction and loss of interest caused by eye strain is noticeably lessened in a room amply flooded with "controlled" daylight of natural color and uniformity. Adequate classroom lighting, several times the minimum state requirements for schools, can be achieved without any harmful bright spots or glare.

TOP•LIGHT'S room-conditioned, "eye comfort" natural daylight can be brought into any part of the building either as the only source of daylight or in conjunction with wall fenestration. The amount of light needed in any given area can, to a surprising degree, be predetermined in the planning.



Complete installation and construction details will be sent upon request. Our sales and engineering departments are always available for consultation. We invite your inquiry.



American 3 Way

No. 67 M • STAGE VENTILATOR

Automatically opens in case of fire to pull flame, smoke and fumes UP AND OUT.

In case of fire the fusible links are melted and doors open automatically. Complete specifications and specific information regarding individual requirements are available on request.

American 3 Way stage ventilators meet the National Board of Fire Underwriters requirements which set the standard for state and municipal codes.

AMERICAN 3 WAY-LUXFER PRISM CO.
431 south dearborn st. • chicago 5, illinois

AMERICAN 3 WAY-LUXFER PRISM CO., INC.
51 - 49 35th st. • long island city, new york

Brochure No. Sch. 6-5



Adlake aluminum windows

- SLASH CLEANING COSTS
- ELIMINATE MAINTENANCE
- REDUCE AIR CONDITIONING AND HEATING COSTS

FOR THESE OUTSTANDING BUILDINGS!



Colerain Township School, Cincinnati, Ohio
Architects: Sullivan, Isaacs & Sullivan
General Contractor: Henry Kappen

ADLAKE DOUBLE HUNG ALUMINUM WINDOW

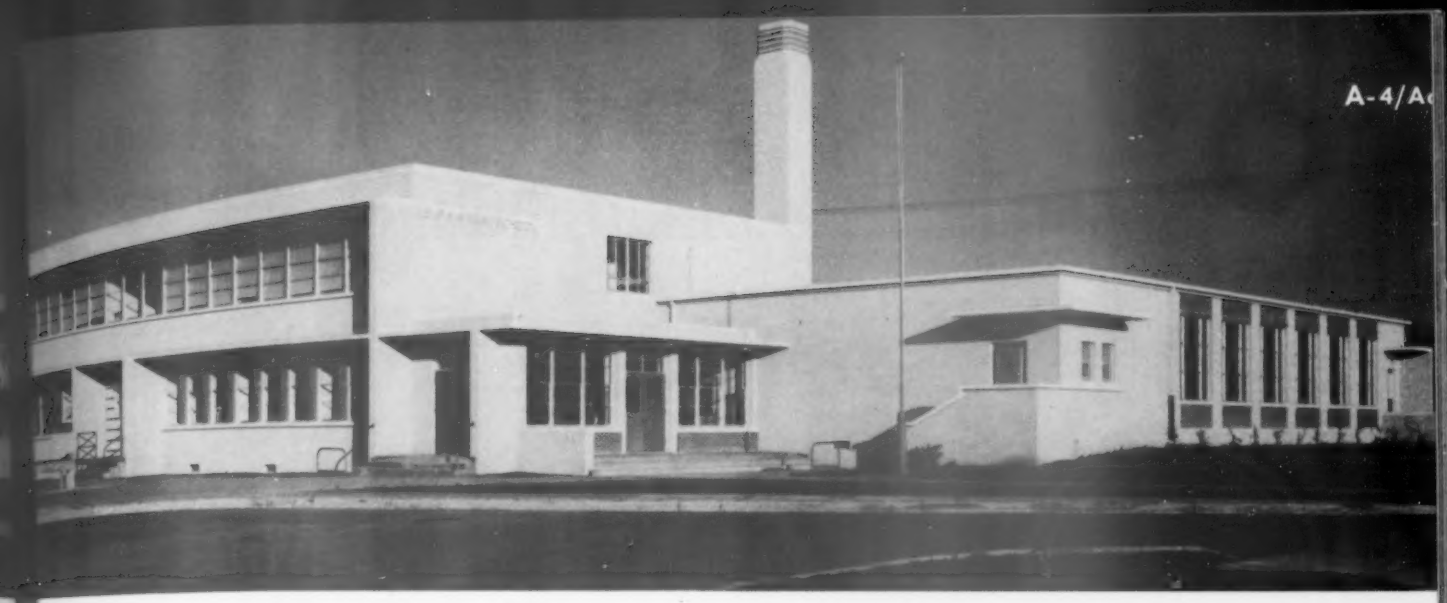
Adlake aluminum windows are used in these attractive schools

Architect: Joseph H. Saunders
General Contractor of Section now under construction: Joseph F. Nebel Co.
ADLAKE REVERSIBLE WINDOW
Educational Center, National Education Association, Washington, D. C.



Architect: Howard Dwight Smith, University Architect
General Contractor: James I. Barnes Construction Co.
ADLAKE DOUBLE HUNG ALUMINUM WINDOW
Caroline Bradley Residence Hall, Ohio State University, Colu





Elma A. Neal School, San Antonio, Texas
Architects: Phelps & Dewees & Simmons
Ralph H. Cameron, Associate Architect
General Contractor: Emmett T. Jackson & Son

ADLAKE DOUBLE HUNG ALUMINUM WINDOW



Memorial Library, University of Wisconsin, Madison, Wisconsin
Architect: Roger C. Kirchoff, State Architect
General Contractor: Gust K. Newberg Construction Co.

ADLAKE DOUBLE HUNG ALUMINUM WINDOW

Architects: Ellerbe & Co. *General Contractor:* McGough Brothers
O'Shaughnessy Hall of Liberal and Fine Arts,
University of Notre Dame, Notre Dame, Indiana

ADLAKE DOUBLE HUNG ALUMINUM WINDOW



only **Adlake** aluminum windows give these advantages!



Positive protection against water and air infiltration!

Quality control tests make sure you get a weather tight window when you specify Adlake. In this test on an Adlake Double Hung Window, for instance, approximately 300 gallons of water a minute are played on the window. Not a drop comes through! In another test, wind pressure equivalent to 97 M.P.H. on one side of the window does not cause the slightest draft on the other, due to air infiltration!



Finger-tip control!

Adlake Aluminum Windows may be raised or lowered with ease, and laboratory tests prove that this "finger-tip control" is not lost throughout the life of the window.

For Adlake Windows have been raised *one million times*, and still operate as smoothly and easily on the last raising as on the first!



Easy installation—and no maintenance!

Adlake Aluminum Windows save construction time, trouble and money because they are ready to be secured directly into the prepared masonry openings. And you can forget about maintenance other than routine window washing. For Adlake Aluminum Windows never warp... never rot... never rattle or stick... never need painting. They keep their good looks and easy operation for the life of the building!

Sales Representatives in principal cities

The Adams & Westlake Company

Adlake 98th year of serving the transportation and building industry

Established 1857 • Elkhart, Indiana • New York • Chicago

SALES OFFICES: 319 W. Ontario Street, Chicago, Illinois • 224 Penobscot Bldg., Detroit, Mi

A-4/al

Windows

that SAVE MONEY year after year!

REPORT	
PERMANENT BEAUTY	A
LOW-COST MAINTENANCE	A
EASY OPERATION	A
LONG LIFE	A



QUALITY APPROVED

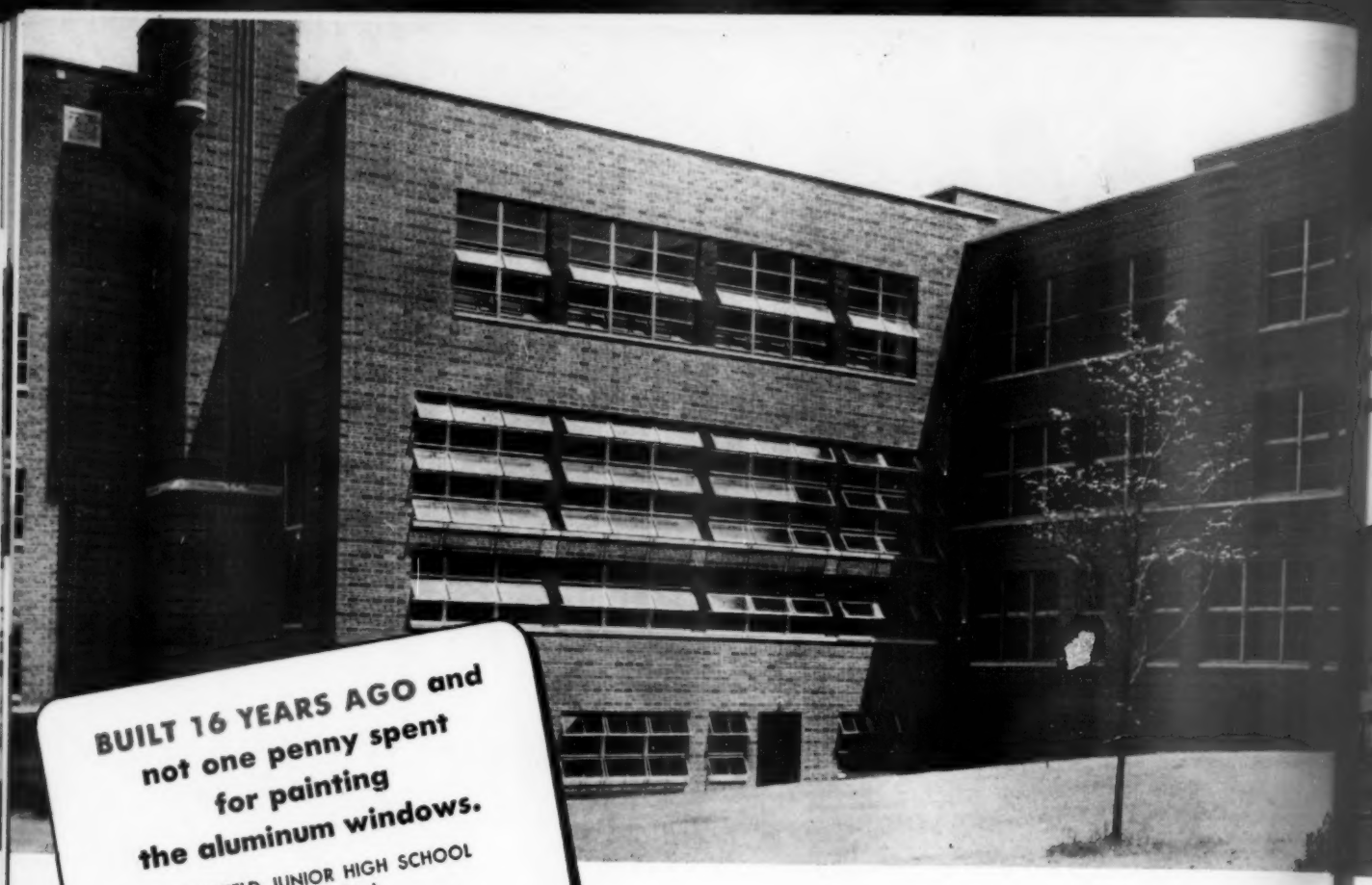
(TYPE)

A.W.M.A. Quality Specifications—Materials, Construction, Strength of sections and Air infiltration requirements—Confirmed by Pittsburgh Testing Laboratory.

MEMBER—ALUMINUM WINDOW MANUFACTURERS ASSOCIATION

Quality Approved

ALUMINUM WINDOWS



BUILT 16 YEARS AGO and not one penny spent for painting the aluminum windows.

BLOOMFIELD JUNIOR HIGH SCHOOL
Bloomfield, N. J.
Architect: Starrett & Van Vleck

HERE'S MORE PROOF

YOU CAN SAVE MONEY

WITH WINDOWS THAT

NEVER NEED PAINTING!

For schools, hospitals, apartments, commercial and industrial buildings, where maintenance expense is to be kept at a minimum, insist on

QUALITY APPROVED
(TYPE)

Quality Approved

ALUMINUM



EXPERIENCE SHOWS:

ALUMINUM WINDOWS SAVE MANY DOLLARS ON PAINTING ALONE

Have you considered recently how much it costs to maintain an average 4′ 0″ x 6′ 9″ window by periodic painting? Reports of maintenance superintendents for several large commercial buildings say their records show it costs from $2.00 to $3.00 (average $2.65) per window per year when painted every 5 years on outside and every 3 years on inside.

Now, just think how much you save over a period of 30 or 40 years when your new building has "Quality-Approved" aluminum windows.

Experience in all types of buildings—schools (like the one shown on the opposite page), hospitals and other buildings—erected 15 to 20 years ago, shows that not one penny was ever required for painting the aluminum windows.

That's why today, more and more architects as well as maintenance-conscious building owners insist on "Quality-Approved" aluminum windows for all new buildings.

Aluminum windows, whether they be double-hung, casement, sliding, projected or awning type, are the only practical, reasonably-priced windows that *never* require painting . . . that cannot rust or rot, warp or swell . . . that retain their trim, modern-looking appearance for the life of the building.

A WORD OF CAUTION—Remember, that only aluminum is rustproof through and through. Mere surface protection against rust is not enough. Wear, unintentional scratches in delivery or installation may nullify any protective surface coating and soon require painting.

"Quality-Approved" aluminum windows are available through many manufacturers in sizes and styles that fit any exterior design treatment. For your protection and full satisfaction, insist on the "Quality-Approved" Seal when you specify or OK specifications.

For a copy of our 1955 window specifications book and names of approved manufacturers, consult Sweet's Architectural Catalog (Section 16a/ALU) or write direct to Dept. ASU-55.

Aluminum Window Manufacturers Association

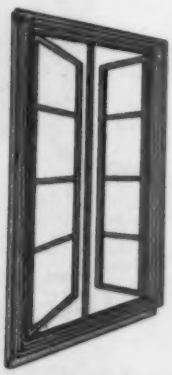
75 West Street, New York 6, N. Y.

WINDOWS





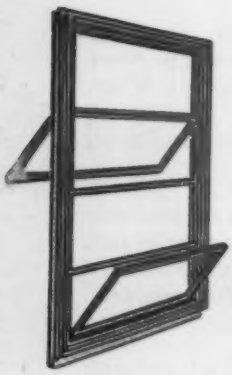
awning



casement

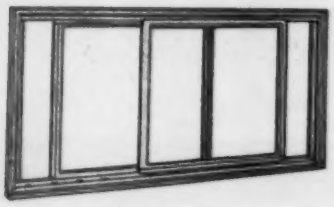


double-hung



projected

sliding



These WINDOW MANUFACTURERS are ready to supply you with *Quality Approved* ALUMINUM WINDOWS

	DOUBLE HUNG	CASEMENT	AWNING	PROJECTED	
ALCASCO PRODUCTS, Inc. 12640 Burt Road, Detroit 23, Michigan		★		★	★
ALUMINUM HOME PRODUCTS CO. Carr St., Knoxville, Tenn.		★			
THE WM. BAYLEY COMPANY 1200 Warder St., Springfield 99, Ohio			★	★	
BOURNE PRODUCTS, INC. 900 Bourne Place, El Cajon, Cal.		★		★	
CECO STEEL PRODUCTS CO. Sterling Aluminum Window Div. 5601 West 26th St., Chicago 50, Ill.	★	★		★	
CUPPLES PRODUCTS CORPORATION 2650 So. Hanley Rd., St. Louis 17, Mo.	★	★	★	★	★
FENTRON INDUSTRIES, INC. 2801 Market St., Seattle 7, Wash.		★	★	★	
MICHAEL FLYNN MFG. CO. 700 E. Godfrey Ave., Philadelphia 24, Pa.	★	★	★	★	★
GENERAL BRONZE CORP. Stewart Ave., Garden City, N. Y.	★	★	★	★	★
METAL ARTS MANUFACTURING CO., INC. Harwell Rd., Atlanta, Ga.	★				
REYNOLDS METALS CO. (Window Div.) 2000 S. 9th St., Louisville, Ky.	★	★	★	★	
THE F. C. RUSSELL CO. (Aluminum Division) Box 27, Bristol, Pa.	★				
J. S. THORN CO. 8501 Hegerman St., Philadelphia 36, Pa.	★	★	★	★	
UNIVERSAL WINDOW CO. 950 Parker St., Berkeley 10, Cal.		★	★	★	
WARE LABORATORIES, INC. 3700 N.W. 25th St., Miami, Fla.		★	★	★	
WINDALUME CORPORATION Kenvil, N. J.	★				

ALUMINUM WINDOW MANUFACTURERS ASSOCIATION

75 West Street • New York 6, N. Y.

FROM SKYSCRAPERS TO SCHOOLS

Cupples Products Corporation is one of the nation's largest and most successful manufacturers of aluminum windows and doors for schools, hospitals and commercial structures. Our modern fabricating plant, equipped with the best machinery available—including extrusion presses—produces windows of highest standards at economical prices. Cupples Windows are superior in strength, in weight of section, in construction, in weather-tightness, in freedom from maintenance.

Double hung, projected, ribbon, special windows and doors have been furnished on hundreds of buildings throughout the country. Cupples not only produces conventional windows and doors, but also specializes in complete custom-designed metal facades. Today's trend to aluminum "skin" buildings or aluminum "curtain walls" has been greatly accelerated by the economical and practical solution of this type of construction by the Cupples engineering and fabricating groups. These same designers and consultants are ready to help architects on any of their problems with aluminum façade or window designs.





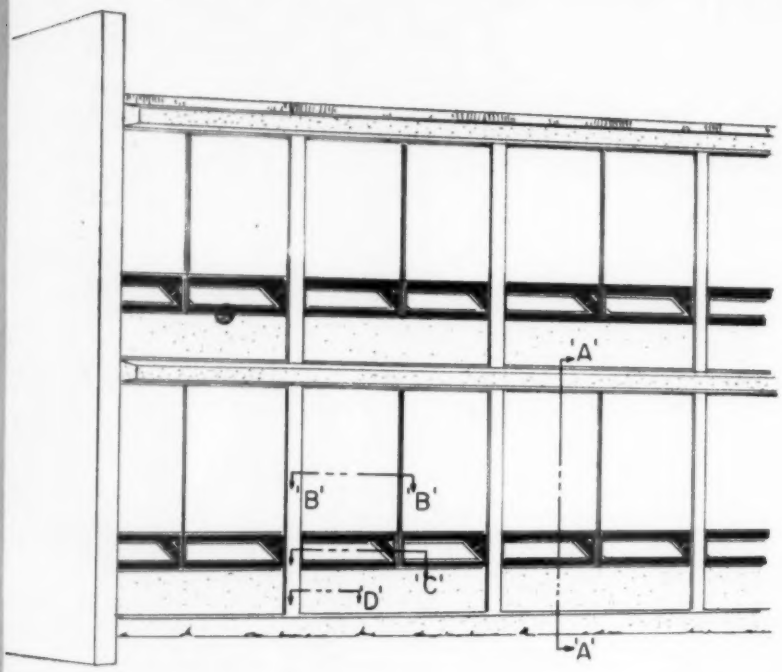
CUPPLES PRODUCTS is a versatile aluminum sash and metal façade fabricator. The New York skyscraper (Webb & Knapp, 116 W. 34th St.) shown above, is an example of Cupples economical aluminum "skin" construction. Low in cost—free from maintenance—inside cleaning of sash. The General George W. Wingate High School, Brooklyn—one of the most unique public schools ever built—is just another of many such jobs turned out by Cupples, where only the finest special double hung and projected sash were considered by architects and owners.

Cupples PRODUCTS CORP.

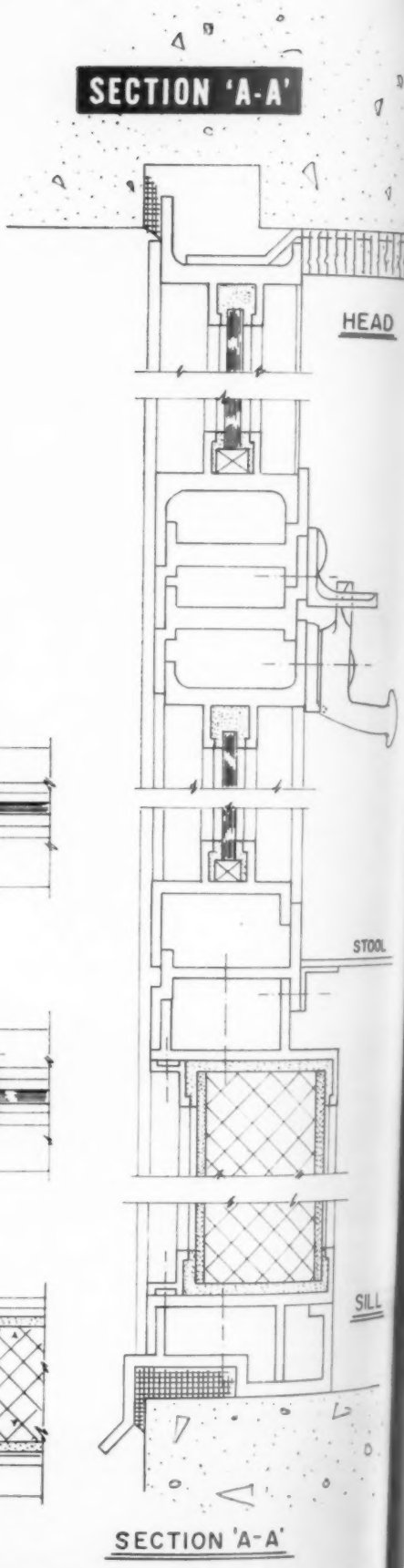
2650 South Hanley Road
St. Louis 17, Mo.

QUALITY APPROVED

SUGGESTED PANEL DETAILS OF A SCHOOL

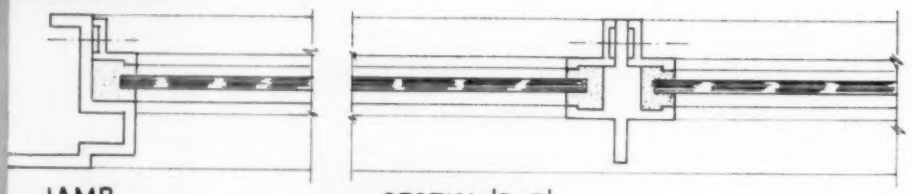


SECTION 'A-A'

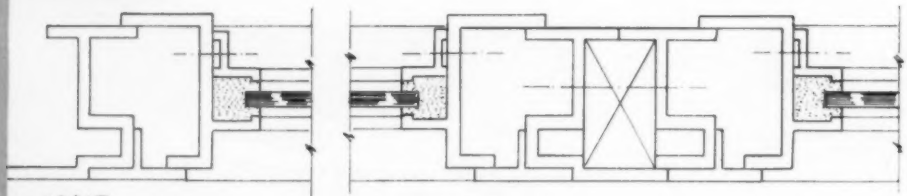


SECTION 'A-A'

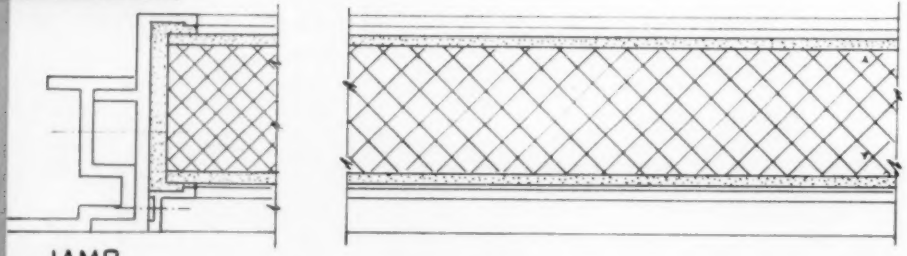
SECTION 'B-B'



SECTION 'C-C'

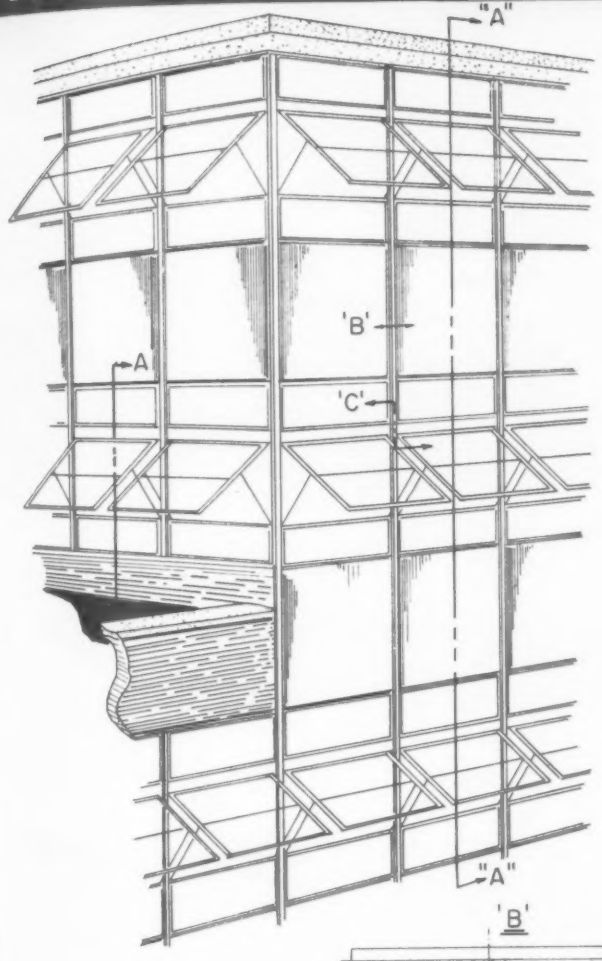


SECTION 'D-D'

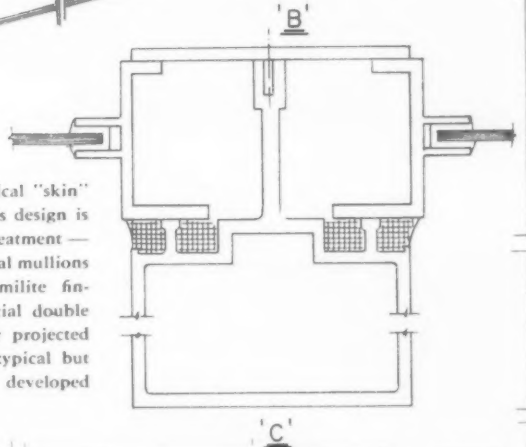


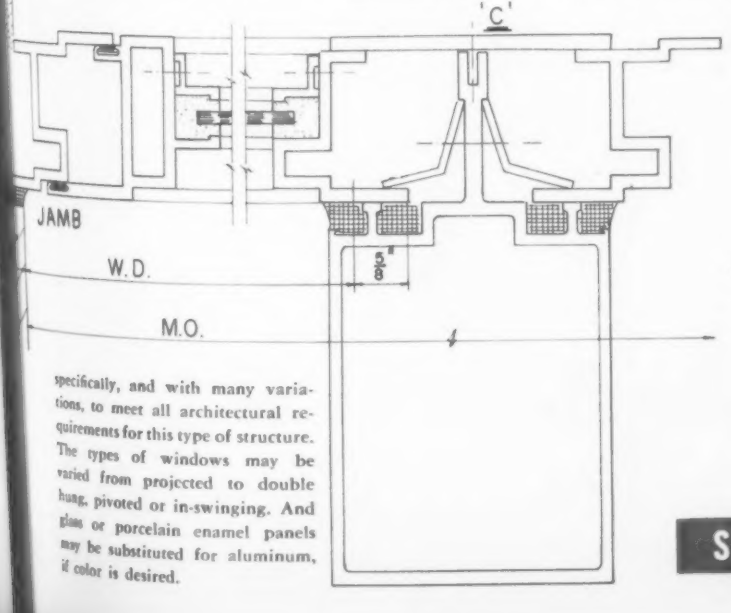
A low cost treatment of aluminum hopper and fixed sash in conjunction with insulated panels. Panel thickness may be varied from 2" to ⅛" depending upon the requirements. Many times in this type of construction, the interior finish of the panel is such that it can be painted, thus becoming the finish wall of the classroom. Aluminum, porcelain enamel, Cemesto Board, glass or many other materials can be used as panels. Various mullion designs may be adopted to obtain varying architectural effects. Similar construction is available with any type of projected, double hung or special windows depending upon the architect's requirements.

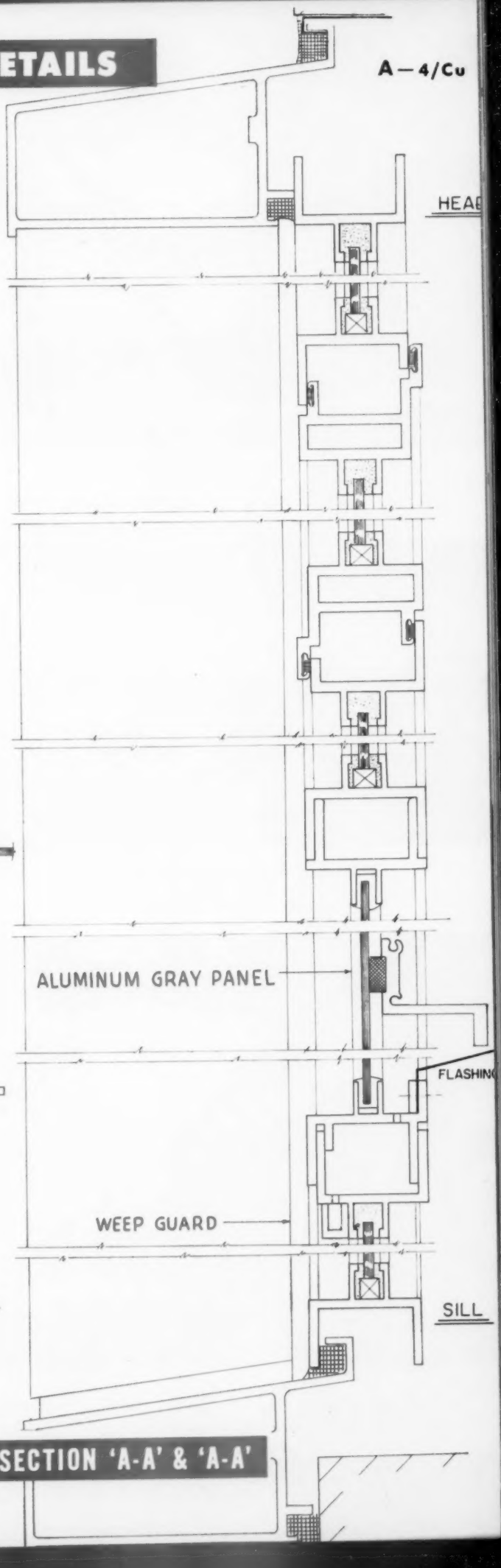
TYPICAL ALUMINUM "SKIN" DETAILS



A practical and economical "skin" building. The key to this design is simple architectural treatment — hollow extruded structural mullions — contrasting gray alumilite finished panels — and special double weatherstripped, tubular projected sash. These details are typical but general. They can be developed specifically, and with many variations, to meet all architectural requirements for this type of structure. The types of windows may be varied from projected to double hung, pivoted or in-swinging. And glass or porcelain enamel panels may be substituted for aluminum, if color is desired.







SECTION 'A-A' & 'A-A'

CUPPLES WINDOWS CHOSEN FOR THESE SCHOOLS

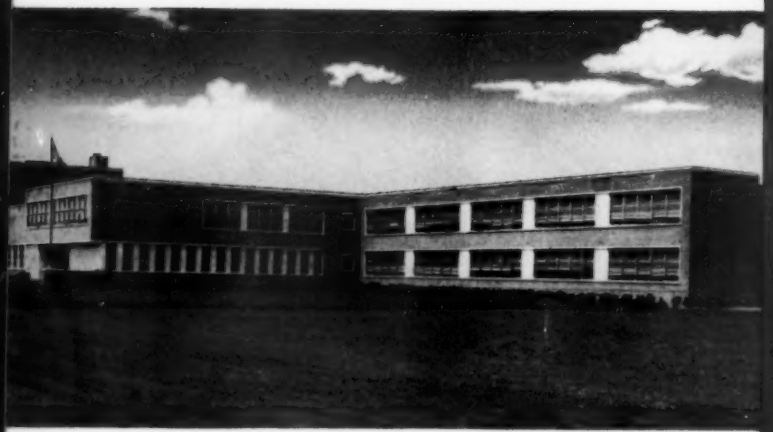
. . . and for thousands of other structures from coast-to-coast



FIELD HOUSE, MARYWOOD COLLEGE
Scranton, Pa.
Architect: Henry D. Dagit & Sons, Philadelphia



BEITEL SCHOOL
Laramie, Wyoming
Architect: Hitchcock & Hitchcock



THOMAS J. RUSK JUNIOR HIGH SCHOOL
Dallas, Texas
Architect: George L. Dahl, Dallas



NOVITIATE MISSIONARY SERVANTS OF THE MOST BLESSED TRI
3501 Solly St., Philadelphia, Pa.
Architect: Henry D. Dagit & Sons ,1329 Race St., Philadelphia



COLONIE SCHOOL
Colonie, New York
Architect: Ryder & Link



JESSE H. JONES LIBRARY, UNIVERSITY OF HOUSTON
Houston, Texas
Architect: Cameron Fairchild

CUPPLES PRODUCTS CORP.

2650 South Hanley Road St. Louis 17, Mo.



Maintenance Saving

aluminum WINDOWS

by GENERAL BRONZE



GENERAL BRONZE CORPORATION

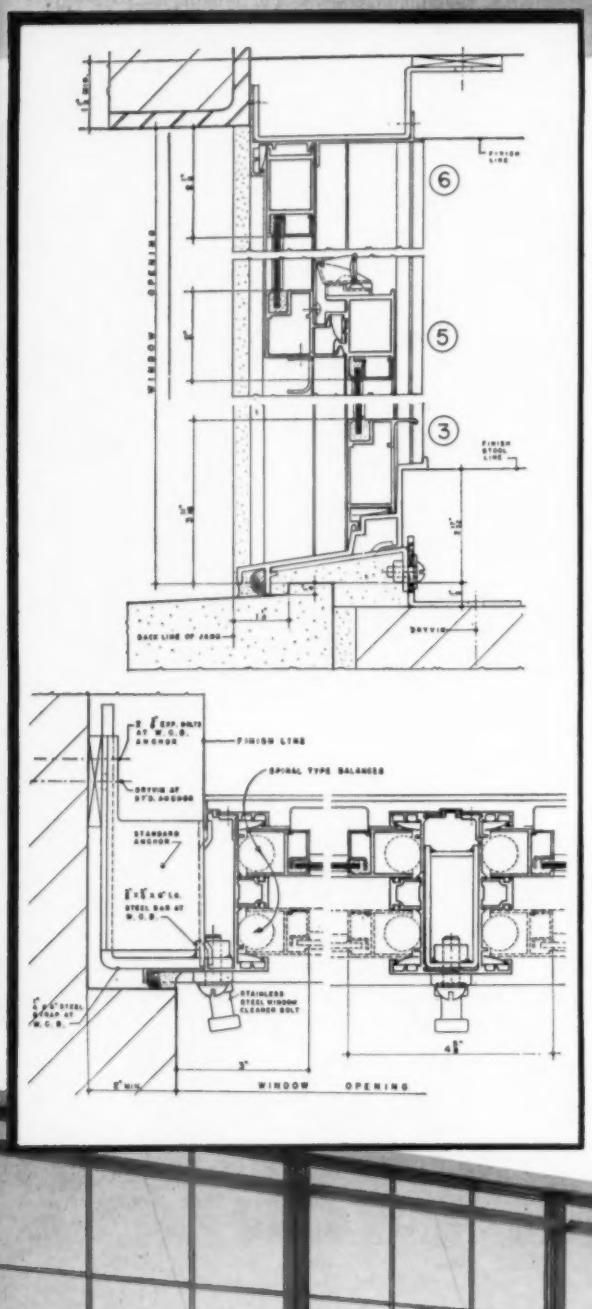
STEWART AVE., GARDEN CITY, L. I., N. Y.

DISTRICT OFFICES

100 Park Avenue, New York, N. Y

3849 West Lake St., Chicago, Ill.

PERMATITE DOUBLE-HUNG WINDOWS



ALUMINUM WINDOWS by GENERAL BRONZE

Pioneers in the production of aluminum windows for schools, hospitals and other institutional and monumental buildings, General Bronze Corporation is today recognized as the foremost manufacturer of aluminum windows in the world. Its window installations are to be found in such outstanding buildings as Lever House and the U. N. Secretariat Building in New York City, the Pan American Life Insurance Co. Building, New Orleans, the Gateway Center Buildings, Pittsburgh, Pa. and many others from coast to coast.

GB PERMATITE aluminum windows are favored by architects and school authorities because they embody many exclusive design features resulting from our more-than-40 years' experience in producing fine quality windows, and because they are precision-made to give countless years of efficient, trouble-free window service. Manufactured from strong extruded sections of aluminum alloy 63S-T5, they have welded frames with heavy sill and jamb sections, plus welded tubular sash sections to assure extra strength and rigidity.

GB PERMATITE aluminum windows reduce maintenance costs to an absolute minimum. They cannot rot or rust. They eliminate forever the costly expense of periodic painting and repairs. They have stainless steel weatherstripping that gives tight, positive closing, keeps out cold drafts and helps save fuel costs.

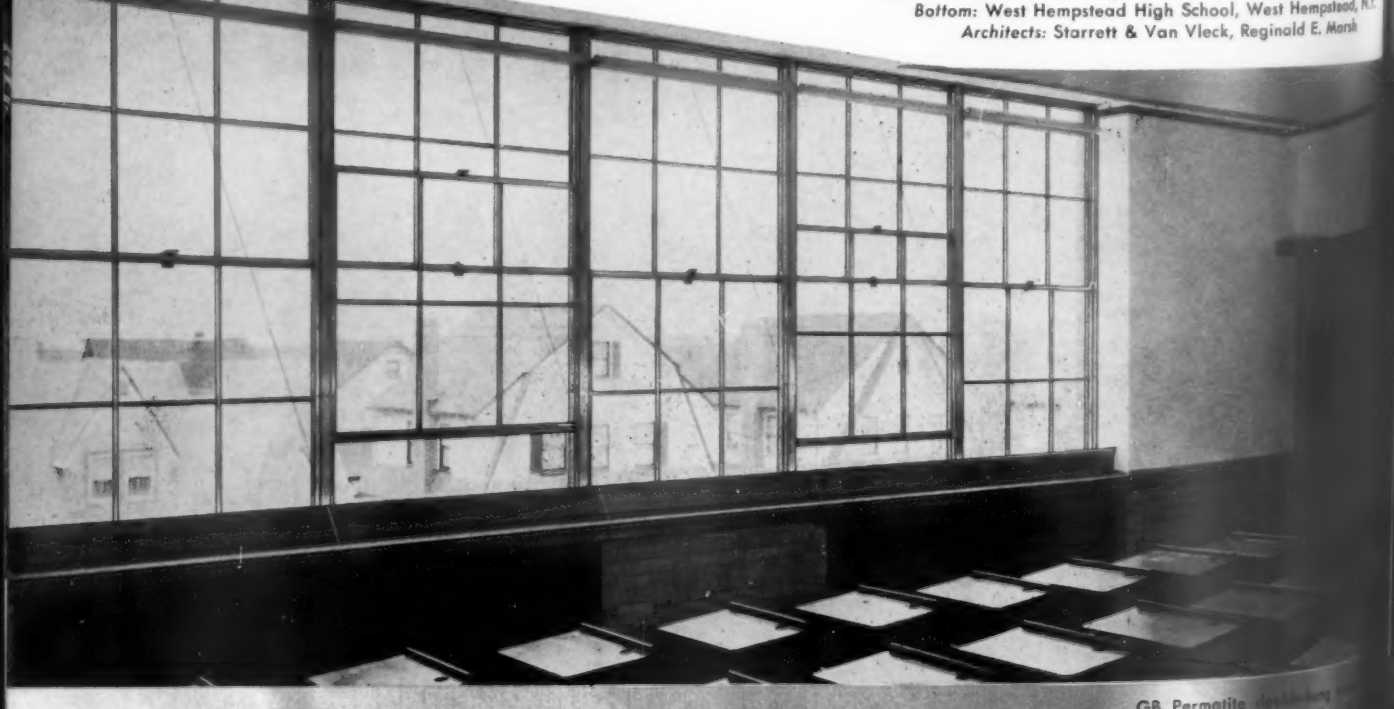
As you plan new school buildings, be sure you specify GB PERMATITE aluminum windows. Whether the school be large or small—whether it be one story or many stories, you'll find a GB window just suited to your needs. GB PERMATITE windows are available in all styles—double-hung, casement and projected (including mechanically operated projected windows)—and in any size to meet your requirements.

See our complete catalog in Sweet's Architectural File or write for your copy. Address Dept. AS-55. General Bronze Corporation, Stewart Ave., Garden City, N. Y.

SEE OUR CATALOG IN SWEET'S

Schools pictured on front page

Top: Saddle Rock Elementary School, Great Neck, N.Y.
Bottom: West Hempstead High School, West Hempstead, N.Y.
Architects: Starrett & Van Vleck, Reginald E. Marsh



GENERAL BRONZE CORPORATION

PERMATITE PROJECTED WINDOWS

GET ALL THESE ADVANTAGES

NO PAINTING NEEDED
GB aluminum windows cannot rust or rot. They never need painting, either outside or inside. This annual saving soon exceeds any difference in the initial cost of the window.

SIMPLE, EASY OPERATION
Floating sash construction provides smooth, easy action and prevents binding or rattling.

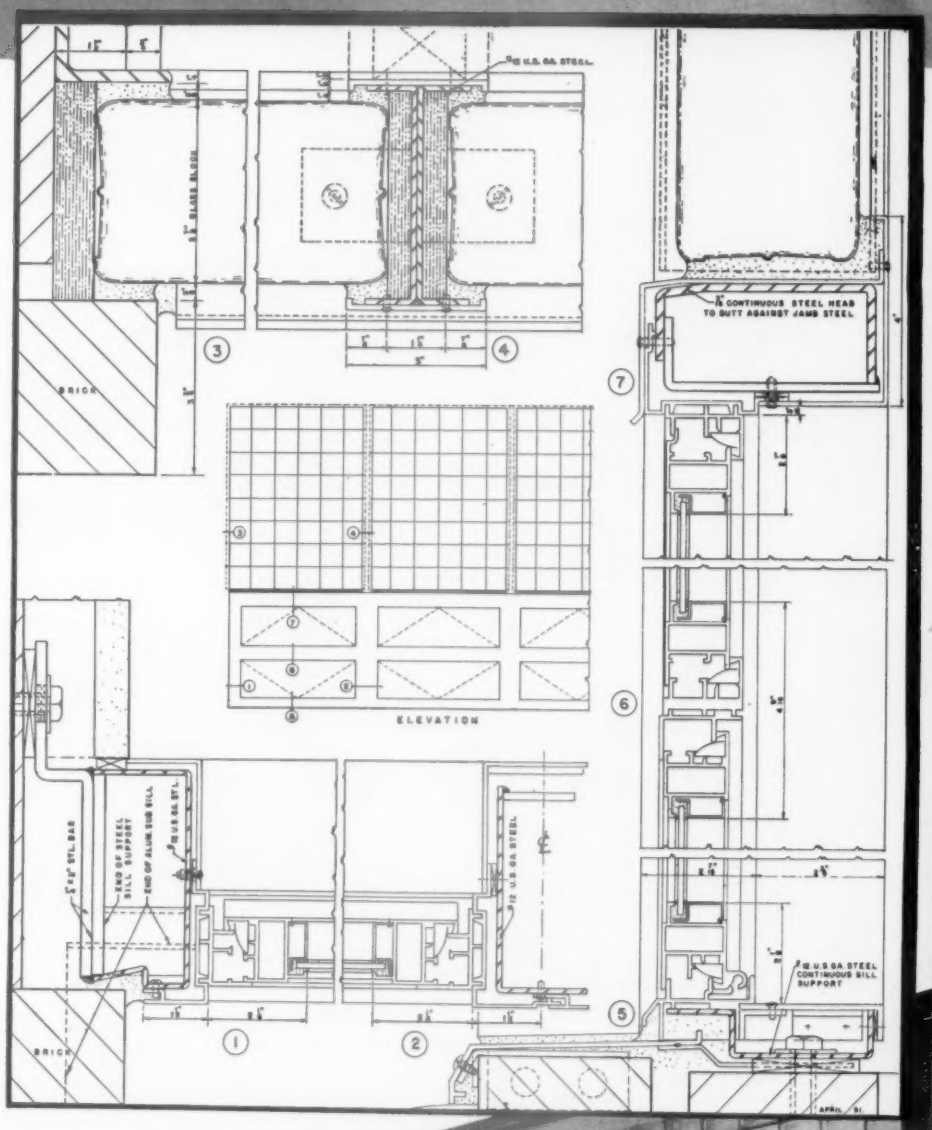
NO MAINTENANCE EXPENSE
The durability, structural and mechanical efficiency of Permatite windows assure continuous trouble-free and maintenance-free operation at all times.

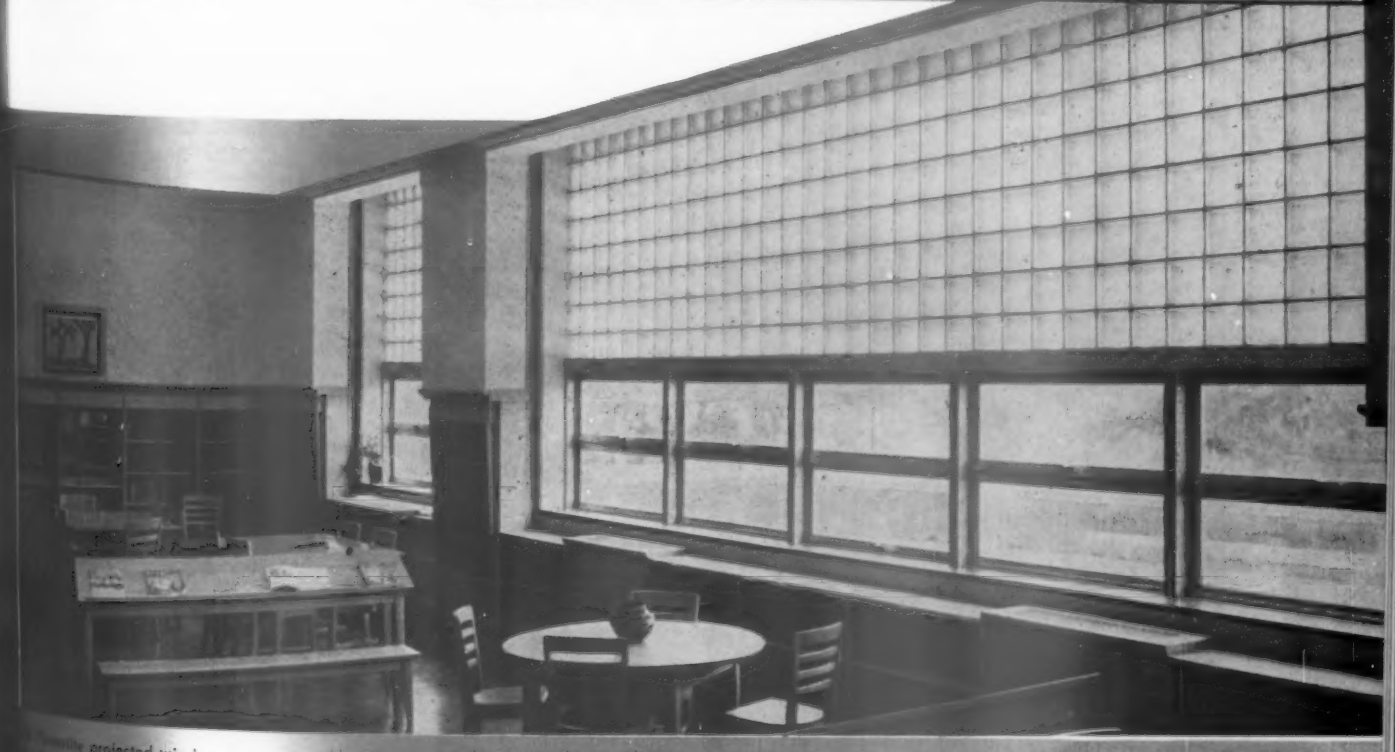
FIT ALL TYPES CONSTRUCTION
Permatite windows can be used with any type of construction material—brick, stone, concrete block, glass block or frame.

FIT ANY BUILDING DESIGN
GB Permatite aluminum windows, with their neutral color, harmonize with any style of architectural design.

MAXIMUM LIGHT
The narrow muntins and sight lines of GB Permatite windows were designed to provide maximum light conditions in any size opening.

TESTED AND APPROVED
All GB Permatite aluminum windows have been tested and approved by the Pittsburgh Testing Laboratories and carry the AWMA Quality-Seal of Approval.





projected windows
Rock Elementary School, Great Neck, L. I., N. Y.
Shepard & Van Vleck, Reginald E. Marsh

GENERAL BRONZE CORPORATIO

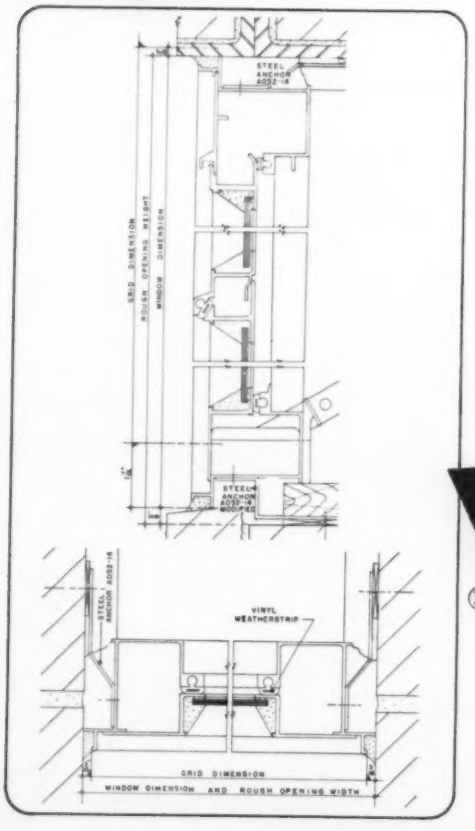


aluminum AWNING WINDOWS

IN STOCK SIZES

by America's foremost manufacturer

GENERAL BRONZE



Now . . . regardless of budget limitations, any school can afford the best in aluminum awning windows.

General Bronze—long recognized for its superior-quality, custom-fabricated school windows — now offers its ALWINTITE line of aluminum awning windows in stock sizes for schools, hospitals, hotels, apartments and commercial buildings.

These stock-size ALWINTITE windows offer all the advantages of superior design, quality materials and precision workmanship for which General Bronze has been famous—yet they are priced to meet most any budget. For complete information see our catalog in Sweet's, or write for free copy. Address Dept. ASU-55.

GENERAL BRONZE CORPORATION

ALWINTITE®

aluminum

WINDOWS and DOORS

by GENERAL BRONZE CORPORATION

ALWINTITE DIVISION • GARDEN CITY, N. Y.

3 WAYS TO GLAZE SCHOOL WINDOWS

Selecting the best type of glass for glazing school windows is as important as selecting the type of sash. Choice of glass should be guided by careful consideration of several factors—the daylight desired, your local climatic conditions, the hazards of breakage and, of course, the cost. How these factors influence choice of glass for windows is briefly summarized here for the guidance of school building committees and architects.

DAYLIGHT WALLS
for Maximum Daylight and Vision

A Daylight Wall means windows that extend from wall to wall and from the floor or sill to the ceiling. They may be glazed with window glass, sheet glass, Parallel-O-Plate glass, heat absorbing glass or *Thermopane** insulating glass . . . whichever best suits your needs.

Two great virtues are offered by properly designed Daylight Walls. They permit better illumination of the room with natural daylight than does any other type of wall construction. Second, by affording minimum obstruction to vision, they give a sense of outdoor spaciousness and a feeling of freedom from confinement, both of which are psychologically beneficial.

Since their introduction by forward-thinking architects before World War II, Daylight Walls have come to be used more than any other type of fenestration in the great postwar period of school building. It is significant that all seven prize-winning designs and all ten honorable-mention citations in the 1953 Competition for Better School Design, sponsored by *The School Executive*, employed Daylight Walls.

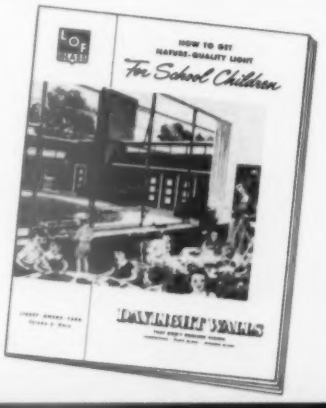
As with any other structural element of a building, proper design for the site and locality is essential with a Daylight Wall. Such things as the amounts of direct sunlight, light from the sky and light reflected from the ground or other surfaces must be considered. Daylight controls such as blinds, drapes or roof overhangs are desirable because the quantity and quality of light is subject to change during the day and through the seasons. Also, for good distribution of light after it enters the room, interior surfaces must have brightness ratios that assure good vision, free from glare.



Abundant natural daylight and a clear view to the hills make this a pleasant room for children in Pacheco School, Ignacio, Calif. Architect, John Lyon Reid, San Francisco.

Fuller details on the merits and design of Daylight Walls are contained in the book described below. **

DO YOU HAVE A COPY? Written especially for school building committees and architects, this 24-page, fully illustrated book is packed with basic facts about daylighting schools. Ask for *How to Get Nature-Quality Light for School Children.* Free. Dept. 3855, Libbey-Owens-Ford Glass Co., 608 Madison Ave., Toledo 3, Ohio.

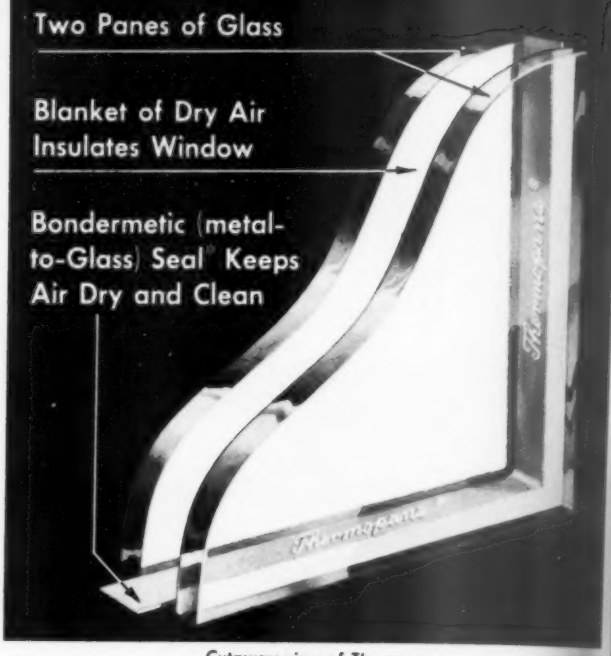


LOF GLASS

LIBBEY • OWENS • FORD GLASS COMPANY • TOLEDO 3, OHIO

Thermopane

INSULATING GLASS



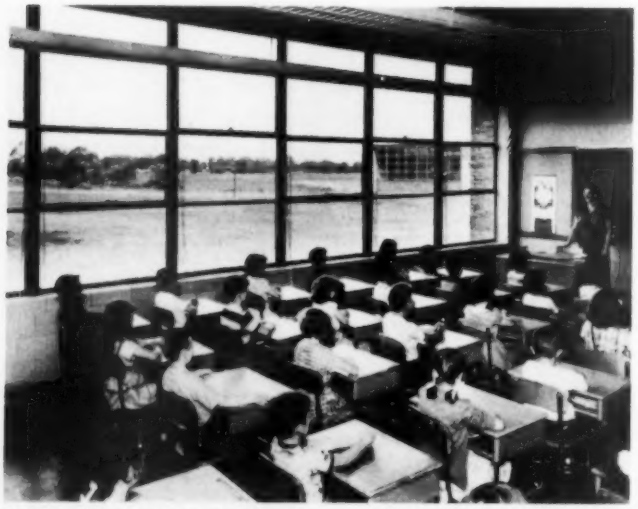
Cutaway view of *Thermopane*

for Comfort and Fuel Economy

In areas of the country where heat is required for four or more months of the school year, more and more new school buildings are being double glazed with *Thermopane*. Its extra cost is returned in two ways: In extra square feet of usable floor space near windows and in direct dollar savings in fuel costs.

When they are glazed with *Thermopane*, big windows are perfectly practical in cold climates and do not entail oversize heating plants or expensive distribution systems to heat the area near windows. The insulating air space in *Thermopane* keeps the room-side pane warmer than is the case with single glazing. As a result, heat does not radiate from children's bodies to the glass surface at the rate it does with single-pane windows. Pupils and teachers can work in greater comfort near *Thermopane*.

By insulating the window, you enjoy fuel savings year after year that amortize the cost of *Thermopane*. As compared to using single glass, heat loss through windows is reduced 44% by using *Thermopane* having a ¼-inch air space between its two panes. With ½-inch air space, heat loss is reduced 50%.



Rush-Henrietta Central School, Rochester, N. Y., has *Thermopane* Daylight Walls and, because of them, has been heated far more economically than similar-sized schools in the area that have single glazing. Architect: Benedict Ade, Rochester.

Comparative heat transmission table

The over-all heat transmission coefficient U varies with the ranges of temperature at which it is determined. For most practical heat loss calculations, coefficient U is the value determined at ten degrees outside temperature, 70 degrees inside temperature, 15 mph outside air velocity, 0.25 mph average inside air velocity.

Kind of Glass	Glass Thickness	U Value — Air Space		
		None	¼"	½"
Single Glass	⅛"	1.16		
	¼"	1.15		
Thermopane	⅛" or ¼"		.65	.50

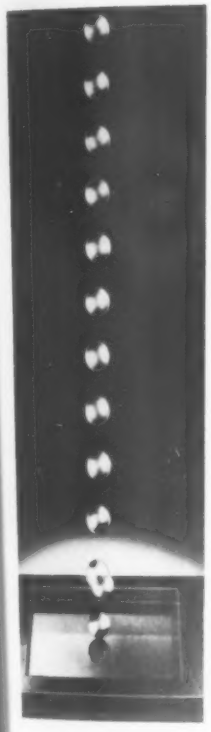
Thermopane also reduces sound transmission, a great virtue for schools in noisy localities. It reduces noise transmission over single glass by 44%.

For school glazing, *Thermopane* comprised of two panes of window glass is commonly used. It has the same insulating qualities as *Thermopane* made of higher priced plate glass but, of course, at some sacrifice in clarity of vision. *Thermopane* units in standard sizes are stocked by L·O·F Distributors for ready delivery. Their price is lower because they are made in volume due to their popularity. Many brands and types of metal and wood sash accommodate standard sizes of *Thermopane*.

L·O·F GLASS

LIBBEY·OWENS·FORD GLASS COMPANY · TOLEDO 3, OHIO

*Tuf-flex** TEMPERED PLATE GLASS for Resistance to Breakage



Vandalism and carelessness have made glass replacement a costly item for many schools. Many, too, have experienced accidental breakage in gymnasiums and in windows adjacent to playgrounds. A practical answer to this problem is glazing with *Tuf-flex* tempered plate glass.

Tuf-flex is three to five times more resistant to impact shock from blunt objects than ordinary plate glass of the same thickness. The test illustrated at the left shows how effectively *Tuf-flex* glass resists impact. A 2-pound steel ball breaks ordinary plate glass ¼" thick when dropped from a height of 8 inches, on the average. With *Tuf-flex* ¼" thick, the average critical height goes up to 44 inches.

Translate that comparison into impact from baseballs, footballs or stones—and you can see why *Tuf-flex* glass can save money for you. It often is cheaper to use *Tuf-flex* for all glazing in a gym or alongside a playground than it is to use other materials or regular glass completely covered with guards. With *Tuf-flex*, guards are used only as extra protection where direct body contact may occur.

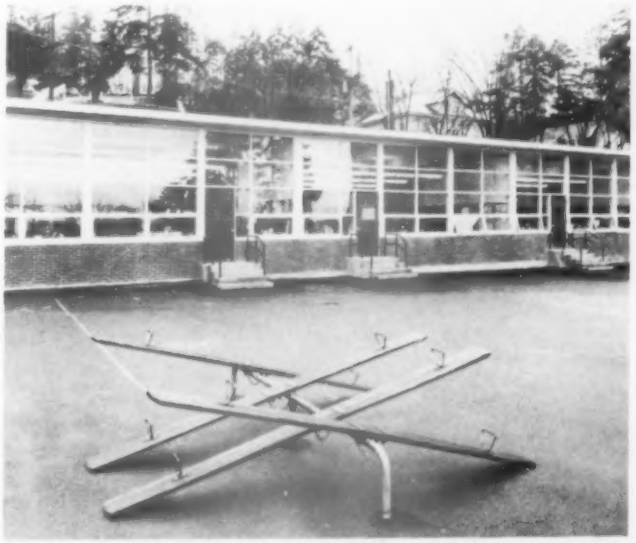
Tuf-flex contributes to the practicability of all-purpose rooms. In a combination gym and auditorium, for example, you don't want windows completely covered with steel bars, yet you want protection from breakage. With *Tuf-flex*, you can have the beauty of clear plate glass areas, plus protection.

While *Tuf-flex* glass, like any glass, is not unbreakable, the heat-tempering process at the factory makes it stronger. When the limit of resistance is reached, *Tuf-flex* disintegrates into small particles resembling bath salts, which reduces the possibility of injury.



Proof of resistance to impact . . . *Tuf-flex* is used for basketball backboards in many gymnasiums.

MANY USES. In addition to windows, *Tuf-flex* is used for basketball backboards, for kick plates and push plates on doors, for balustrades and railings, and for enclosure of exhibits, particularly those containing valuable or fragile materials. *



Games in the play area are no hazard to these *Tuf-flex* windows in the Ainsworth School in Portland, Oregon. Architect: Raymond Kermit Thompson, Portland.

LOF GLASS

LIBBEY•OWENS•FORD GLASS COMPANY • TOLEDO 3, OHIO

In planning window treatment for new schools, remember that *Tuf-flex* glass is an investment that can pay dividends for many years. If you have experienced excessive breakage of glass in some areas of your present school, it may pay you to replace ordinary windowpanes with *Tuf-flex*.

Exact sizes must be specified because *Tuf-flex* cannot be cut or otherwise processed after it is tempered. It can be supplied in circles, squares, rectangular and special shapes cut to pattern. The size limitation for *Tuf-flex* ¼" thick is 72" x 120". For size limitations on plate glass of greater thickness, or of special colors, consult your Libbey·Owens·Ford Glass Distributor or Dealer.



The beauty of clear plate glass is combined with the protection of *Tuf-flex* in this Daylight Wall. Deer Park School, Fairfax, California. Architect: John Lyon Reid, San Francisco.

For further information, call your Libbey·Owens·Ford Glass Distributor or Dealer . . . or call one of the L·O·F District Offices listed below.

Atlanta 3, Georgia — Lamar 5239
223 Peachtree Street, N. E.

Boston 16, Massachusetts — Hubbard 2-0100
20 Providence Street, Park Square

Buffalo 3, New York — Mohawk 7656
14 Lafayette Square

Chicago 3, Illinois — Central 6-2490
120 South LaSalle St.

Cincinnati 2, Ohio — Main 6174
617 Vine Street

Cleveland 13, Ohio — Main 1-7180
1302 Terminal Bldg.

Dallas 1, Texas — Riverside 4026
1402 Tower Petroleum Bldg.

Dayton 2, Ohio — Michigan 8315
901 Third National Building

Denver 2, Colorado — Tabor 5-8015
414 Tramway Bldg.

Detroit 2, Michigan — Trinity 5-0080
610 Fisher Bldg.

Indianapolis 4, Indiana — Melrose 7-1363
5 East Market Street

Kansas City 6, Missouri — Victor 5360-61
1004 Baltimore Street

Los Angeles 5, California — Dunkirk 8-0641
3440 Wilshire Blvd.

Memphis 3, Tennessee — 37-7589
8 North Third Street

Milwaukee 3, Wisconsin — Broadway 2-2887
161 West Wisconsin Ave.

Minneapolis 2, Minnesota — Main 8429
506 WCCO Bldg.

New York 16, New York — Murray Hill 3-
99 Park Ave.

Philadelphia, Pa. — Greenwood 7-412
121 Coulter Ave., Ardmore, Pa.

Richmond, Virginia — 3-
909 East Main Street

St. Louis 1, Missouri — Central 1-
411 N. 7th Street

San Francisco 5, California — Sutter 1-
116 New Montgomery Street

Seattle 1, Washington — Senec
Sixth and Steward Streets

Toledo 3, Ohio — Fairfax
608 Madison Ave.

Washington 6, D. C. — Sterling 3-
806 Connecticut Ave.

L·O·F GLASS

LIBBEY·OWENS·FORD GLASS COMPANY · TOLEDO 3, OH

MARMET
WAUSAU, WISCONSIN

ALUMINUM WINDOWS -- VENTILATORS AND DOORS FOR TODAY'S SCHOOLS

Better light for better sight!
Better ventilation for better health!
The preferred windows for modern school installations, MARMET ALUMINUM RIBBON WINDOWS AND CURTAINWALLS are economical, provide maximum weather protection and permanent life-time maintenance-free operation. MARMET casement or projected-type sash are of monumental type -- manufactured of extra-heavy material. Sash and frame sections are designed to meet the most rigid requirements. Installed into prepared masonry openings, MARMET ALUMINUM WINDOWS offer quality construction of great strength and durability, with exceptional visibility and light area.
MARMET glass block construction ALUMINUM VENTILATORS are available to meet specific requirements and provide ventilation and extra vision in glass block construction. MARMET ALUMINUM DOORS, extruded or aluminum covered, are doors of high structural strength without bulk and permit maximum light area.
Write for complete specifications and details without obligation.





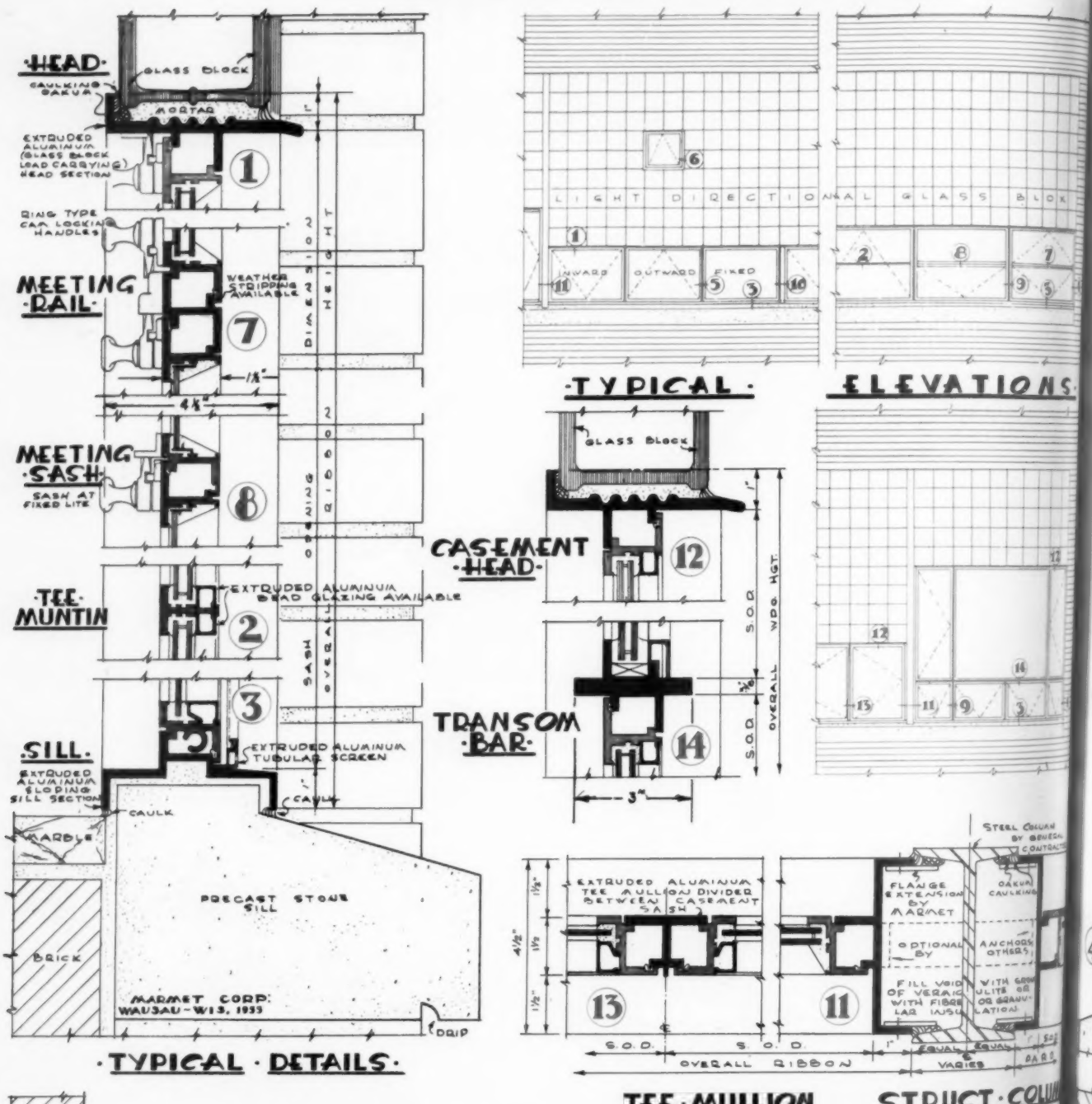


MARMET CORPORATION
WAUSAU, WISCONSIN

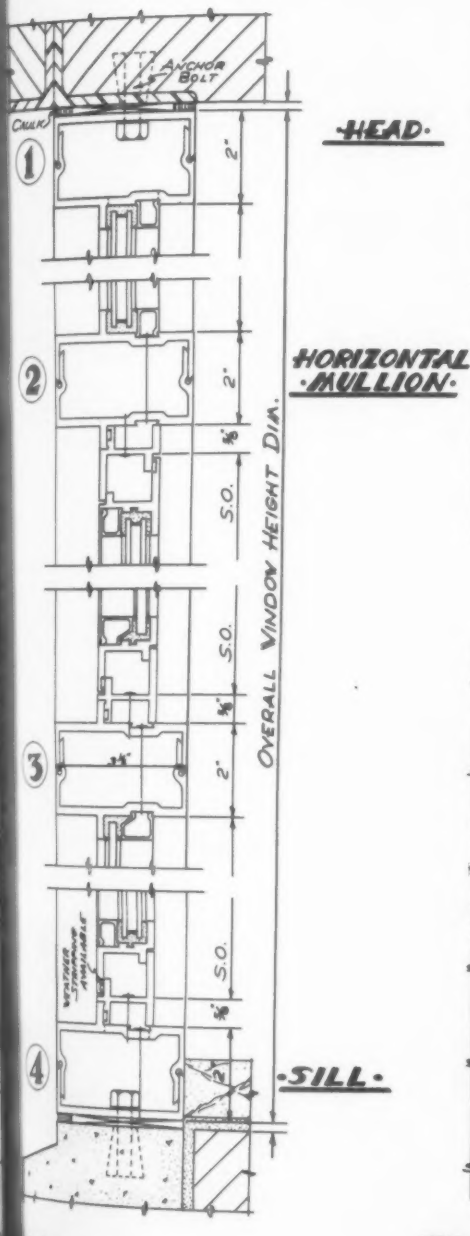
MARMET

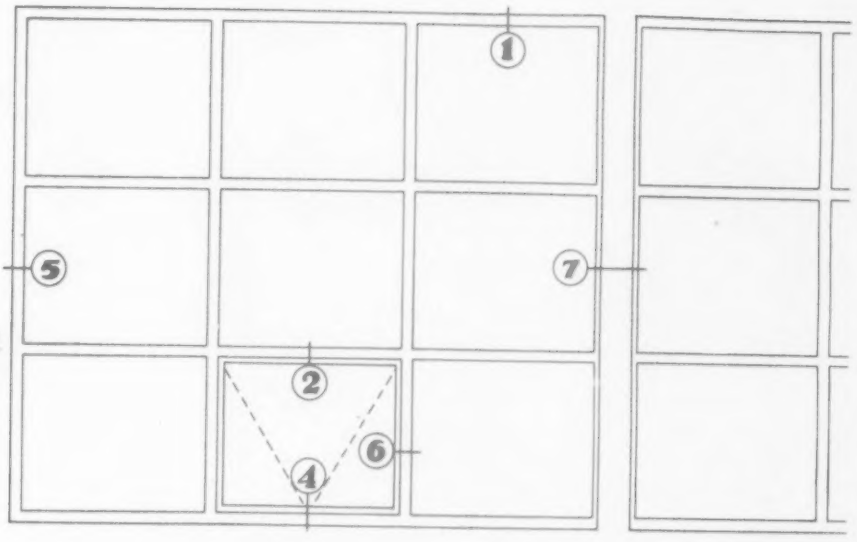
SERIES 200 ALUMINUM RIBBON WINDOWS

SIMILAR DETAILS FOR MARMET CUSTOM WINDOWS

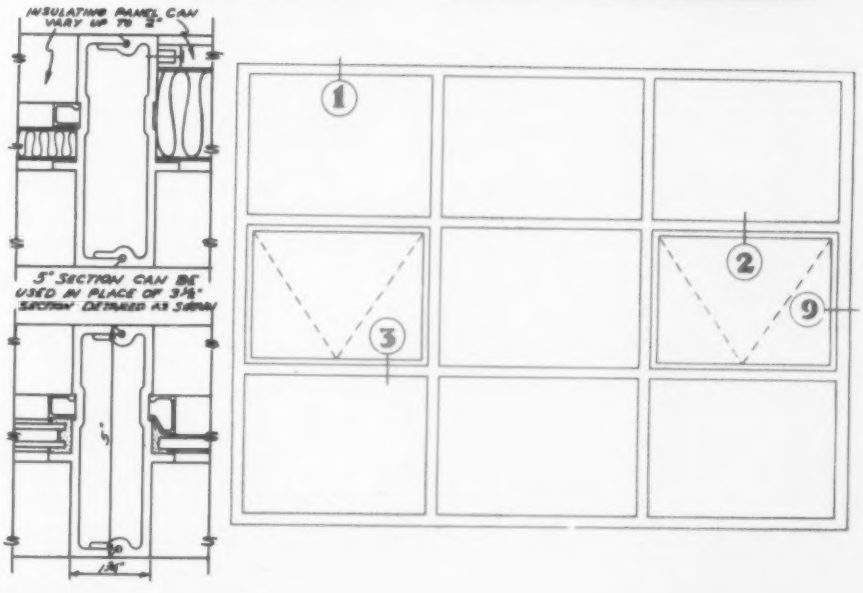


MARMET 600 SERIES CURTAIN WALL

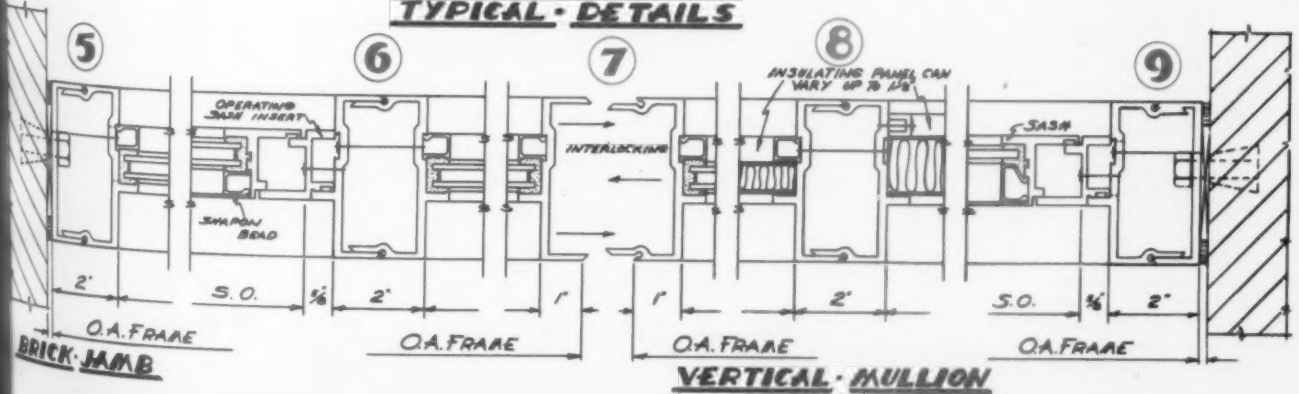




·TYPICAL· ·ELEVATIONS·



TYPICAL · DETAILS



VERTICAL · MULLION

GLASS BLOCK VENTILATORS AND ALUMINUM DOORS



Practical windows which provide ventilation and vision for glass block construction.

Marmet Ventilators with Marmet Satinized Finish enhance the beauty as well as utility of glass block panels and walls.

Sturdy, corrosion resistant, welded construction.

Weathertight -- Fine Hardware.

Removable Sash -- Deep Glass Rabbett.

Marmet Glass Block Ventilator Frames are available in extruded Aluminum, stainless steel and heavy gauge steel. No lintel is required for the installation of Marmet Ventilators because they are sturdily constructed and carry the stress put on by a glass block panel. When installing, it is advisable to brace the opening with a wood prop in the center of the sash while the panel is under construction, removing same after mortar is set.

Because there are many requirements as to types and thicknesses of glass, all Marmet ventilator prices refer to unglazed units.

Marmet Ventilators are available in 30 stock sizes and special sizes will be built in quantity lots to your specifications.

Aluminum screens or storm sash for all sizes are available.

Marmet Ventilators have an integral frame welded at all corners. Individual sash are welded at corners and provided with weather contacts to frame. The projected sash are provided with two balancing arms and sliding friction shows with spring brackets.

FINISH --

All Marmet Ventilators are Marmet Satinized and are further protected with special coating of clear methacylate plastic.

Ventilator sash is provided with one spring-type transom catch.

features

- sturdy
- corrosion resistant
- welded construction
- weathertight
- removable sash
- deep glass rabbett
- fine hardware furnished

specifications

SCOPE OF WORK -- To furnish and install of sizes and types shown on plans and elevations of the drawings, Marmet Ventilators.

MATERIALS -- Ventilators shall be constructed of (Extruded Aluminum Sections, Formed Mild Steel or Stainless Steel) as manufactured by Marmet Corporation, Wausau, Wis.

CONSTRUCTION -- Ventilators shall have an integral frame welded at all corners. Individual sash shall be welded at corners and provided with weather contacts to frame. The projected sash shall be provided with two balancing arms and sliding friction shoes with spring brackets. Aluminum vents are Marmet Satinized and are further protected with clear lacquer. Stainless Steel, natural finish and Steel are prime coated.

HARDWARE -- Ventilator sash shall be provided with one spring-type transom catch.

SCREENS -- See above.

CAULKING -- Mastic caulking should be applied evenly and to the full depth of joint in and outside perimeter of ventilator.



Marmet doors are available in extruded aluminum or [illegible] dried wood cores covered with anodized aluminum.

extruded aluminum doors

The extruded aluminum narrowline doors are striking [illegible] appearance. Their clean-cut design permits great structural strength without bulk and provides maximum light or glass area. The finest extruded aluminum is used: alloy 6063-T5 (63S-T5). Components such as rods, screws and nuts are made of complimentary material, machine cut and fit for accuracy and tightness. Available in natural or aluminum finish. All hardware included.

Furnished as stock packaged single doors only, with hardware, with or without frame and with or without frame and fixed transom. Also available as double doors with hardware with or without frame and with or without frame and fixed transom.

Stock single door packaged units in following sizes 2'6"x7'0", 3'0"x7'0", 3'6"x7'0". Double door packaged units in following sizes 5'0"x7'0", 6'0"x7'0", 7'0"x7'0". With or without frames and transom.

Custom doors are available for most requirements. It is suggested that detailed drawings be submitted for quotation.

Marmet also constructs and furnishes complete entrances as specified. Specifications and details on request or see catalog in Sweet's Files.

aluminum covered doors

Marmet anodized aluminum covered doors are designed to meet the demand for a sturdy, neat, economical, quality door for schools and other institutions. They can be used with metal or wood construction. Core is of the finest ponderosa pine and conforms to National Door Manufacturers' Specifications. Toxic treated, these doors are covered with special .040 anodized aluminum sheet.

Four sizes are stocked, each 1-13/16 in. thick:

(Actual door measurements)

No. 3084 -- 30" x 84"
No. 3684 -- 36" x 84"
No. 4084 -- 40" x [illegible]
No. 4284 -- 42" x [illegible]

Special sizes and finishes available to order.

Complete specifications and details on request.

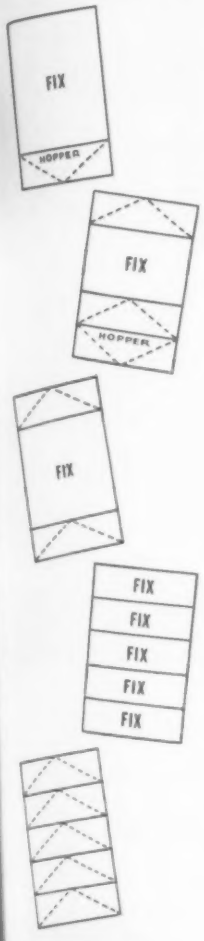
MARMET CORPORATION
WAUSAU, WISCONSIN

TRU-SEAL WINDOW DIVISION

INDUSTRIAL MACHINE TOOL CO. INC.

Fenton, Michigan

TRU-SEAL ALUMINUM AWNING WINDOWS SOLVE TWO VERY IMPORTANT SCHOOL BUILDING PROBLEMS

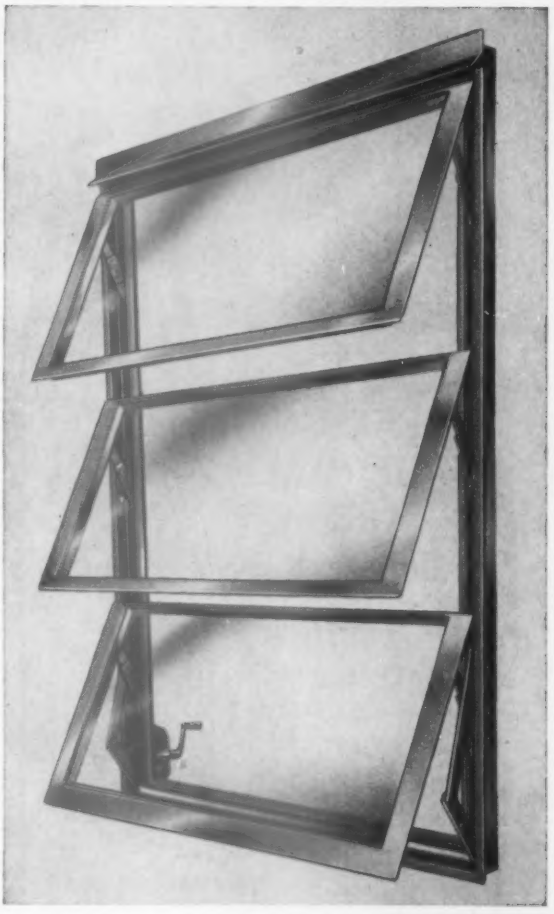


PRIMARY COST

TRU-SEAL aluminum awning windows are available in a wide variety of designs and sizes to fit any style or type of building and are extremely flexible as to figurations. Because TRU-SEAL windows are precision-built, they can be installed at low cost and are competitively priced.

MAINTENANCE COST

TRU-SEAL aluminum awning windows NEVER need paint or putty when aluminum snap-on glazing bead is used. Glass replacement cost due to breakage is very low because of size of pane. All operating vents can be washed on BOTH sides from the inside. TRU-SEAL operating mechanism is absolutely foolproof.



TRU-SEAL

OTHER TRU-SEAL SCHOOLROOM ADVANTAGES

TRU-SEAL

TRU-SEAL awning windows are safer because of their design. The operating mechanism is smooth, effortless and silent. Heavy frame sections have mitered, flash-welded corners and each operating vent has a micromatic adjustment to assure perfect seal. TRU-SEAL windows give you controlled ventilation the year round—a true vinyl weather-seal for winter, and 100% air flow for summer.

PITTSBURGH TESTING LABORATORY INFILTRATION REPORT ON 4' x 5'6" WINDOW IS .059 C.F.M.

DISCUSS THESE TRU-SEAL FEATURES WITH YOUR ARCHITECT

Manufactured under Pat. No. 2383912 (Pending)

THE WILLIAM BAYLEY COMPANY

Springfield 99, Ohio, 1200 Warder St. | New York 17, N. Y., Grand Central Terminal | Chicago 2, Ill., 105 W. Madison St. | Washington 16, D. C., 3701 Mass. Ave., N. W.

Factories: Springfield, Ohio

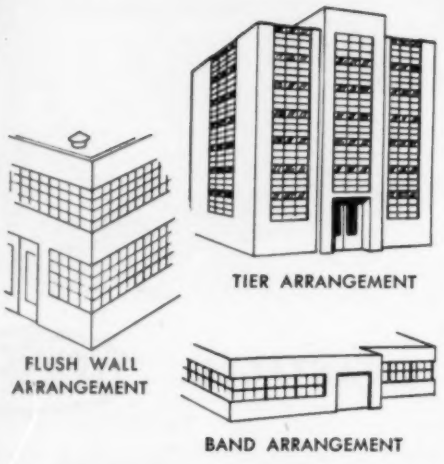
BAYLEY WINDOWS

play a prominent role in building the nation's schools



Immaculate Heart of Mary School, Detroit, Michigan
Clair W. Ditchy, Archt., Detroit, Mich.
W. E. Wood Co., Bldr., Detroit, Mich.

Bayley Projected Windows IN PANEL WALL ARRANGEMENTS Meet A Modern Trend



Without the costliness of special window designing you can now execute many of your design treatments in modern panel-wall or "skin" construction. With Bayley sub-frame design, which accommodates separate window units, standard Bayley Aluminum Projected Windows (with channel frames) of any standard size can be used—offering wide flexibility in the use of newer panel decorating materials, plus the desired window area for providing maximum air, light and vision.

Bayley Projected Windows provide the modern school with better ventilation, vision and natural daylighting

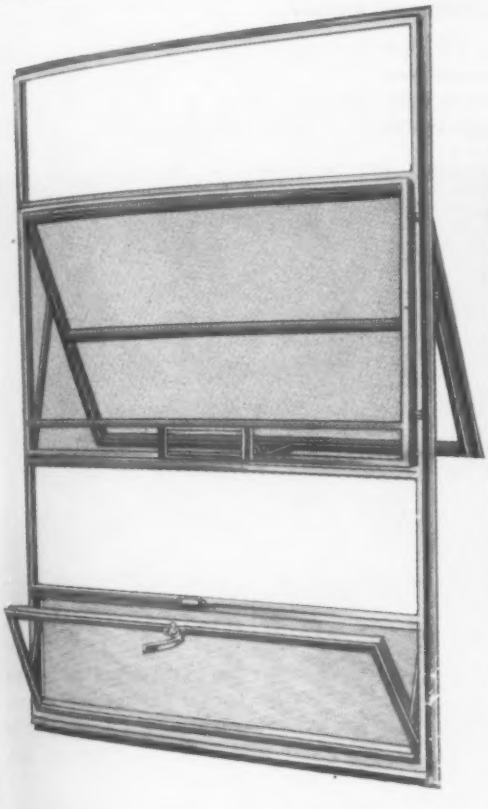
The "better-serve" policy that, for so many years, has keynoted Bayley's client relationship is readily apparent in numerous ways. Constant improvement in product detail and quality is one. Another is exemplified in the Bayley Aluminum Projected Window (offered also in steel) that was designed to provide the window features requested by school authorities. Such features as:

Modern appearance • Economy—painting unnecessary • Permanence — long carefree life • Simplicity — no complicated mechanism • Adaptable to all types of construction • Glazing outside — flat surface inside • Easily washed from inside • Prepared for screens • Permits use of accessories, such as draperies, shades, curtains, venetian blinds or awnings.

Whatever your window requirement may be, Bayley's years of specialized window experience can undoubtedly be of value to you. Write or phone.

See Bayley in Sweet's. Complete catalogs on aluminum windows, 16a/Bay; steel windows, 16b/Ba.

THE WILLIAM BAYLEY COMPANY



BAYLEY
PROJECTED WINDOWS
Aluminum or Steel





Above: Bayley Windows with Projected-in and Projected-out ventilators installed in: Elementary School, Bexley, Ohio
Sims, Cornelius & Schooley, Archt., Columbus, Ohio
Altman Coady Company, Contr., Columbus, Ohio

Below: Bayley Ribbon Windows with Projected-out Ventilators installed in: Fulton School, Springfield, Ohio
Marley W. Lethly, Archt., Springfield, Ohio
Geo. Sheaf & Company, Contr., Columbus, Ohio



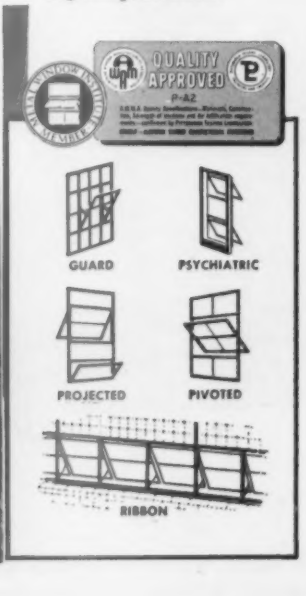


Below: South Mountain Jr. High School, Allentown, Pa.
Heyl, Bond & Miller, Archt., Allentown, Pa.
L. W. Hunsicker Co., Bldr., Allentown, Pa.



WRITE TODAY for these two helpful Data Files . . .

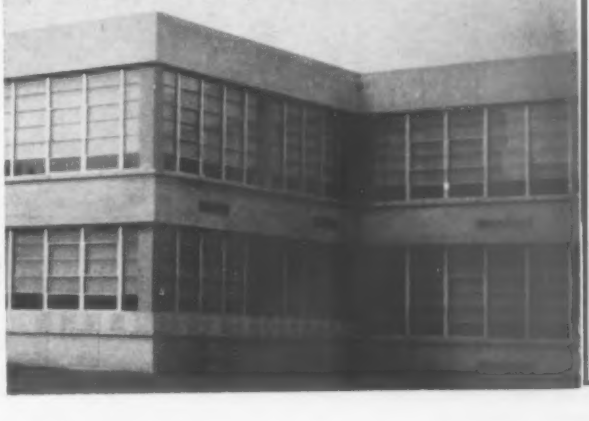
The Catalog gives you complete specifications, while the Drafting Room Standards give full size details for drafting simplification.



Specify **BAYLEY**

and be assured of the benefits from

76 *Years of* **RELIABILITY**

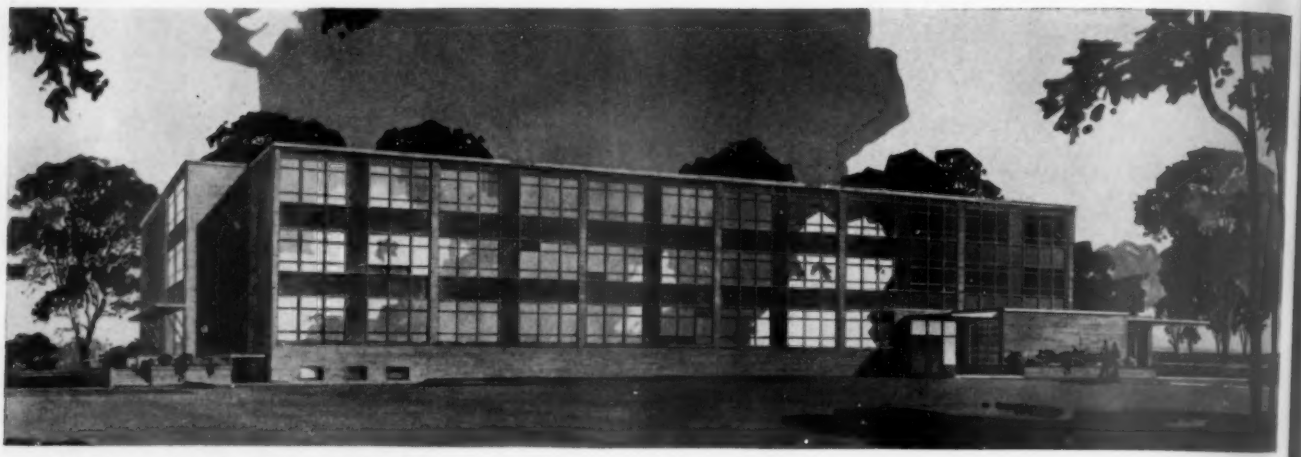


MICHAEL FLYNN MANUFACTURING CO.

Manufacturers of Lupton Metal Windows and Curtain Wall Systems

Main Office and Plant: 700 E. Godfrey Ave., Philadelphia 24, Pa.

New York: 51 E. 42nd Street, New York 17, N. Y.; Los Angeles: 672 S. Lafayette Park Place, Los Angeles 57, Cal.; Western Warehouse: Stockton, California. Offices and representatives in other principal cities.



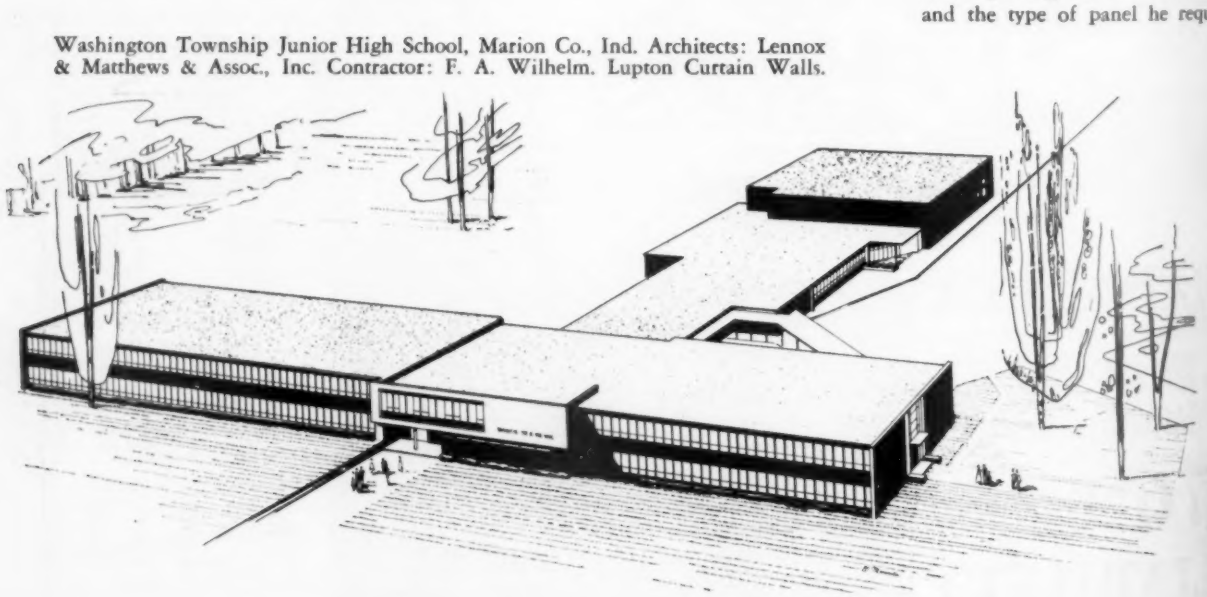
Men's Dormitory, Southern State College. Contractor: Peterson, Garbi & Joseph, Inc. Architect: Wittenberg, Deloney & Davidson, Lupton Curtain Walls.

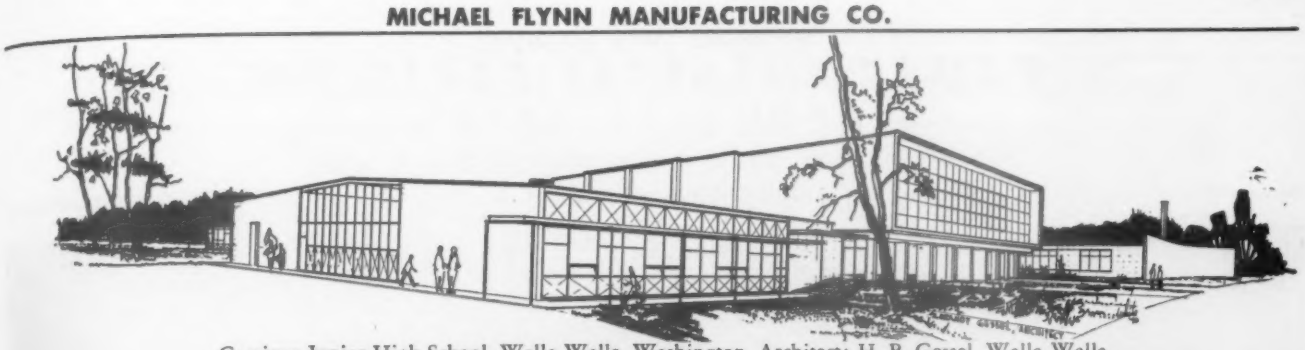
Build that School faster — and better the Lupton Curtain Wall way

Here's a new way to cut school construction time. It's the Lupton Curtain Wall System. Now school buildings can be enclosed in days, not weeks—in any weather, from inside the building.

In modern construction the frame supports the building . . . the walls merely protect it against the elements and add decoration. That's just what Lupton Curtain Walls do—but, do better. These new walls are completely weather-tight. Full insulation can be included. They are decorative—as plain or as colorful as your architect specifies, for he designs the curtain wall. Lupton fabricates it, using the kind of metal window and the type of panel he requests. Panels

Washington Township Junior High School, Marion Co., Ind. Architects: Lennox & Matthews & Assoc., Inc. Contractor: F. A. Wilhelm. Lupton Curtain Walls.





Garrison Junior High School, Walla Walla, Washington. Architect: H. B. Gessel, Walla Walla, Washington. Contractor: A. Ritchie and Co. Lupton Curtain Walls.



Glenbrook High School, Northbrook, Illinois. Architects: Perkins & Will, Chicago, Illinois Contractors: Jacobsen Brothers, Chicago, Illinois. Windows: Lupton Aluminum Master Projected Windows

can be the color, texture and finish that best suits the architecture.

And, here's why buildings can be finished sooner. As soon as final dimensions are determined, Lupton starts making the curtain wall units. They are erected as soon as, or even before, the building skeleton is finished. Units are completely prefabricated, they can be installed at any time of the year, in any weather. It is a one-source-of-supply system. Construction problems are simplified because Lupton Curtain Walls are manufactured, shipped and installed by one responsible organization with 50 years experience in metal fabrication. Even where building codes require a back-up wall, the Lupton System still offers economies in time and labor through prefabrication and all-weather installation.

This new curtain-wall system is the latest addition to the famous Lupton line of metal windows . . . in steel or aluminum . . . in a wide range of styles and sizes to meet every need. Before you finalize your plans, ask your architect about the decided advantages of Lupton Curtain Walls and Lupton Metal Windows—or write direct.

LUPTON

Metal Windows and Curtain-Walls

TRUSCON® STEEL DIVISION
REPUBLIC STEEL

1110 ALBERT STREET • YOUNGSTOWN 1, OHIO

Manufacturers of a complete line of steel windows and mechanical operators. Steel joists . . . Metal lath . . . Steeldeck roofs . . . Concrete reinforcing bars . . . Welded wire fabric . . . Steel inserts . . . Residential, Industrial and Hangar steel doors . . . Steel buildings . . . Radio towers.

The Wall with the Window

TRUSCON VISION-VENT

Vision-Vent is Truscon's exciting new approach to fast, economical construction. It is a complete window wall that incorporates all the mass production and installation economies of standard steel windows.

Each Vision-Vent unit is complete, with arrangements for glass and insulated steel panel. Window openings may be projected-type ventilators or Truscon Double-Hung Steel Windows. Elements can be varied to meet specific requirements.

Weathertight Vision-Vent Window Walls are designed to cover entire wall surfaces. Erection is done from inside and units are easily and quickly installed.

Insulated panels may be colored porcelain enamel or stainless steel. "U" factor is equivalent to that of an ordinary masonry spandrel wall. Less than 1½" thick, they provide extra square feet of floor space. Light weight is reflected in structural savings.

Vision-Vent is recommended for all types of single- and multi-story buildings. A variety of applications have been engineered to provide simplicity of design, weather resistance, low initial cost, low maintenance cost.

Truscon engineers will be glad to study your requirements and develop details and costs for you and your architects.



Truscon Vision-Vent units permit wide latitude in design. Extreme flexibility in arrangement permits variation of elements to meet functional and appearance requirements.



Rooms are light, bright and weathertight when Vision-Vent units are used. Full provision is made for adequate ventilation and efficient air conditioning.

TRUSCON STEEL DIVISION

Truscon Vision-Vent installed at Clemson College



Vision-Vent walls in the new Clemson Barracks, Clemson College, S. C. Lyles, Bissett, Carlisle & Wolff, architects; Daniel Construction Co., contractors

A complete line of Steel Building Products

Vision-Vent is only one of the many items in the Truscon Line—the most complete line of steel building products made by any manufacturer. Every Truscon product is backed by a fifty-year reputation of outstanding service to the building industry.

The full Truscon line of windows includes architectural, intermediate and commercial projected, steel and aluminum casements, aluminum awning, double-hung, ranch, picture, Donovan, detention, basement, and an unexcelled choice of variations.

Other Truscon building products that help build safer, more efficient, long-lasting, low-maintenance schools are steel joists, metal lath, steel-deck roofs, concrete reinforcing bars, welded wire fabric and steel doors.



University of Pennsylvania Physics Lab., Philadelphia, Pa. Architects: Jas. R. Edmonds, Jr., Baltimore, and Willing, Sims & Talbutt, Philadelphia. General Contractor: The Baton Construction Corp. Truscon Architectural Projected, Commercial Projected, Donovan and Maxim-Air Steel Windows installed.

TRUSCON® A NAME YOU CAN BUILD ON

TRUSCON MARK OF MERIT PRODUCTS

TRUSCON STEEL DIVISION
REPUBLIC STEEL
1110 ALBERT STREET • YOUNGSTOWN 1, OHIO

WINDALUME CORPORATION

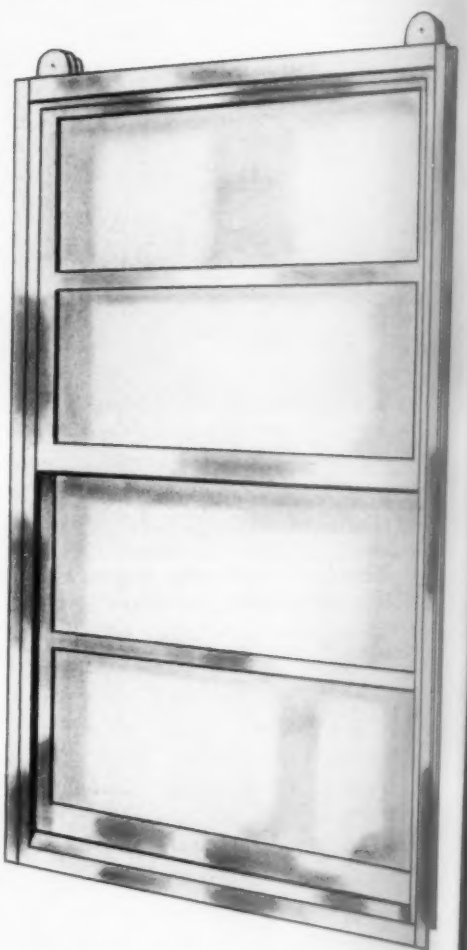
Kenvil, New Jersey

Windalume

MAINTENANCE-FREE EVERLASTING AND RUGGED

Aluminum Double-hung Windows

NO PAINTING OR ANNUAL EXPENSE EVER WITH WINDALUME ALUMINUM WINDOWS.



SERIES—300, DHA3—Designed to meet A.W.M.A. Specification DH-A3

No. 12 Ga. (".080) Sash and Frame.
No. 8 Ga. (".128) Sill.

SERIES—200, DHA2—Designed to meet A.W.M.A. Specification DH-A2

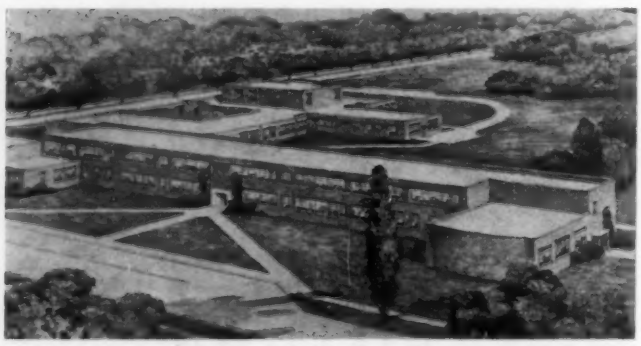
No. 14 Ga. (".062) Sash and Frame.
No. 8 Ga. (".128) Sill.

THE QUALITY APPROVED "WELDED WINDOW"

All joints of sash and frame are both mechanically joined and welded for extra strength. Tested and approved for air infiltration and strength of sections by Aluminum Window Manufacturers Association.

IMPORTANT FEATURES

WEATHERSTRIP—Stainless Steel or Woven Pile Fabric.
BALANCES—Spiral or Overhead Pullman Type.
NYLON GUIDE BLOCKS—Keeps Sash Centered—Prevents Racking.
HOPPER VENTS—Available in lower sash or below impost.



Northside Junior High School, Norfolk, Va.
Rudolph, Cooke & Van Leeuwen, Inc., Architects.

Windalume
CORPORATION
KENVIL, NEW JERSEY

Bring your light control up to date with . . .

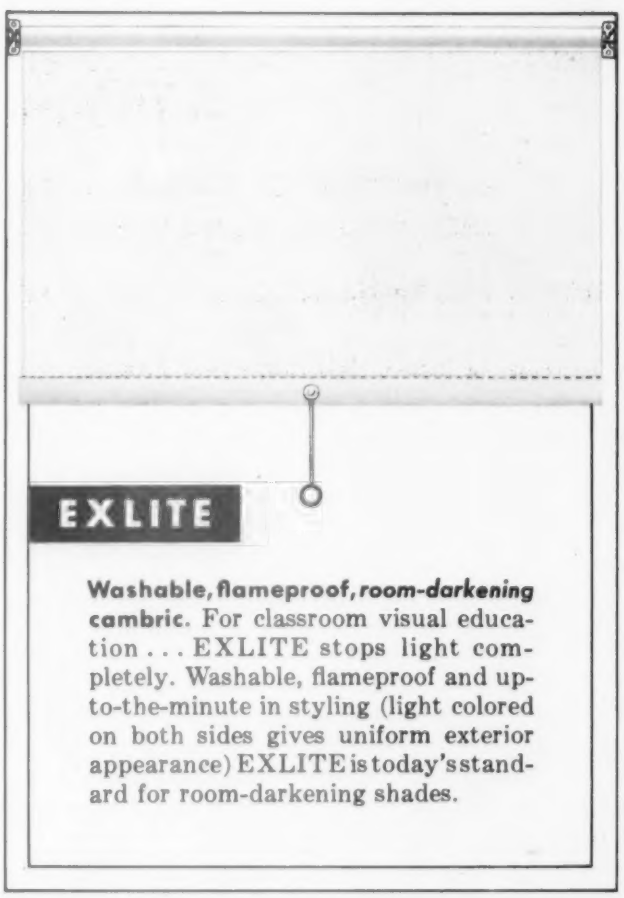
Joanna Western
Cloth Window Shades

School architecture has changed, and with it has changed the ever present problem of light control. Keeping pace with these changes, Joanna Western offers a complete line of window shades and installations designed to bring efficient, practical, economical light control to all windows. There's a Joanna Western Cloth Window Shade designed for every need.



VIKING

Vinyl coated cambric, washable, flameproof. Designed for more service at lower cost, VIKING is ideal for windows exposed to constant hard use. Washable, flameproof VIKING is translucent, the *best* shade for every school installation.



EXLITE

Washable, flameproof, *room-darkening* cambric. For classroom visual education . . . EXLITE stops light completely. Washable, flameproof and up-to-the-minute in styling (light colored on both sides gives uniform exterior appearance) EXLITE is today's standard for room-darkening shades.

MR. BERRY:

Please send,

Architects Specifications from Sweet's Catalog File illustrating complete selection of single and double roller type installations for dependable, economical control of classroom lighting.

Sample books for:

☐ VIKING
☐ EXLITE
☐ COMMANDER VINYL COATED DUCK
☐ SERVICE 8 OZ. COTTON DUCK

We need window shades for:

New School (No. Openings)_____

Building plans and specifications are available for inspection (location)_____

Replacements (No. Openings_____ Type of Installation_____

☐ Send us more information ☐ Have representative call

NAME_____

ADDRESS_____

(STREET) (CITY) (ZONE) (STATE)

TITLE_____

…top" Rollers, a major …indow shade roller design, now standard equipment.

Joanna's unique "Multi-Stop" rollers make it possible to stop the shade every fraction of an inch on the frame. "Multi-Stop" Rollers offer more precise light control, more positive locking action, surer stopping action. All metal parts are plated and rust-proof. *New nylon bearings make operation smoother and quieter.*

"Multi-Stop" action is available in wood rollers for standard size windows or metal rollers for extra large windows.

OLD TYPE ROLLER

Postage Will Be Paid by Addressee

No Postage Stamp Necessary If Mailed in the United States

BUSINESS REPLY CARD

First Class Permit No. 868 Sec. 34.9, P. L. & R., Chicago, Illinois

W. B. BERRY

Joanna Western Mills Company

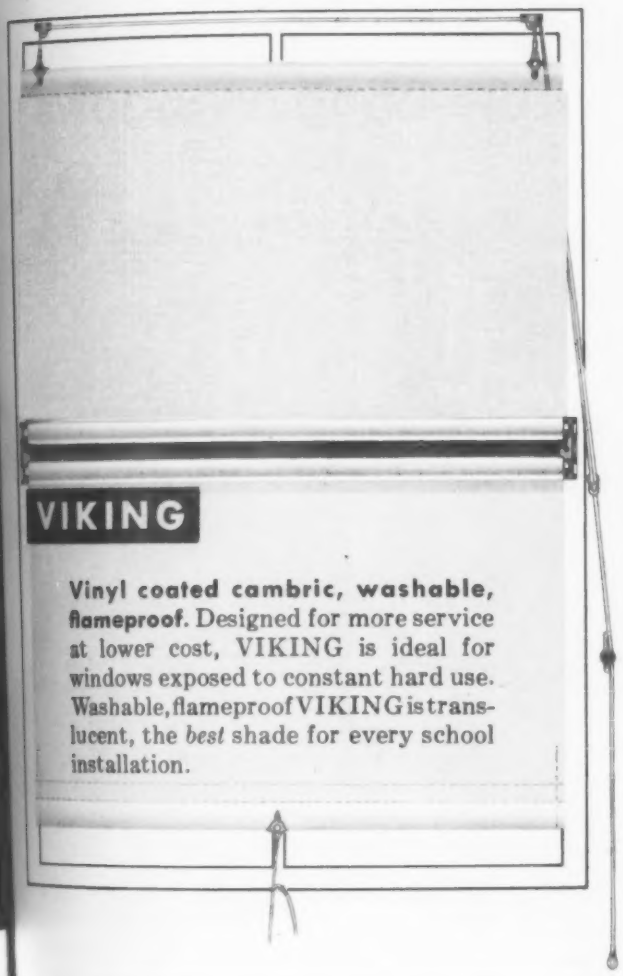
22nd and Jefferson Streets

Chicago 16, Illinois

Bring your light control up to date with . . .

Joanna Western
Cloth Window Shades

School architecture has changed, and with it has changed the ever present problem of light control. Keeping pace with these changes, Joanna Western offers a complete line of window shades and installations designed to bring efficient, practical, economical light control to all windows. There's a Joanna Western Cloth Window Shade designed for every need.



VIKING

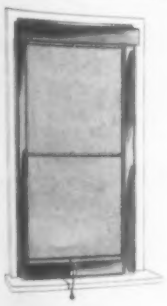
Vinyl coated cambric, washable, flameproof. Designed for more service at lower cost, VIKING is ideal for windows exposed to constant hard use. Washable, flameproof VIKING is translucent, the *best* shade for every school installation.



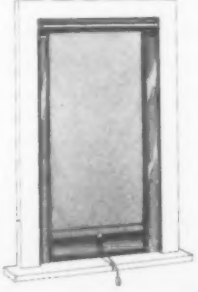
EXLITE

Washable, flameproof, *room-darkening* cambric. For classroom visual education . . . EXLITE stops light completely. Washable, flameproof and up-to-the-minute in styling (light colored on both sides gives uniform exterior appearance) EXLITE is today's standard for room-darkening shades.

Complete darkness for laboratories, auditoriums, visual education rooms . . . Joanna Western DARKO

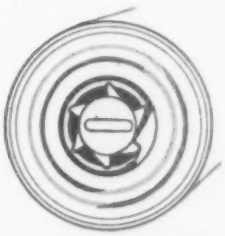


DARKO DELUXE MODEL—De 7800. Absolute room darkening. Recess or face mounted. Side and bottom channels and roller housing at top prevent light cracks around edges.



DARKO STANDARD MODEL—ST 7900. Recess or face mounted—uses a minimum of equipment. Side channels and "Rumple Cloth" apron at bottom seal out extra light.

New "Multi-Stop" Rollers, a major improvement in window shade roller design, now standard equipment.



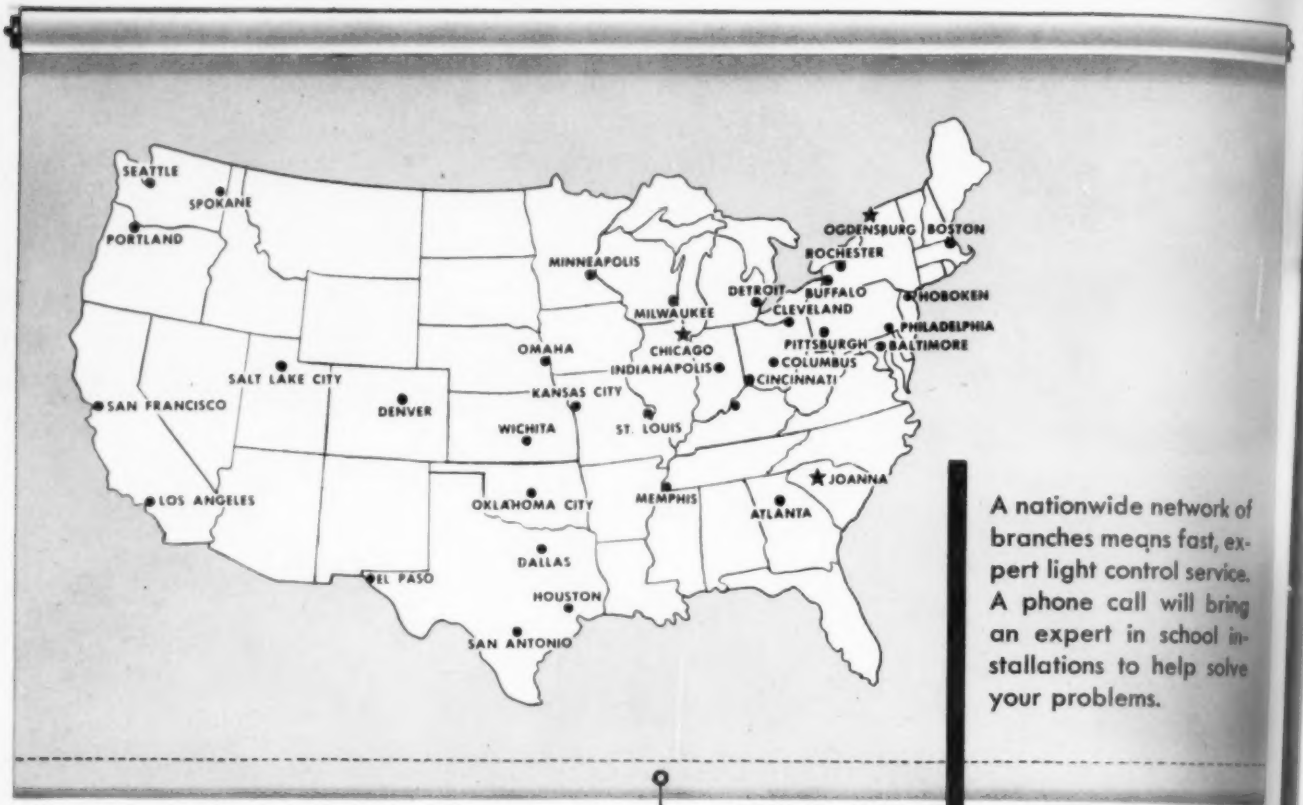
NEW "LEVELINE" ROLLER



OLD TYPE ROLLER

Joanna's unique "Multi-Stop" rollers make it possible to stop the shade every fraction of an inch on the frame. "Multi-Stop" Rollers offer more precise light control, more positive locking action, surer stopping action. All metal parts are plated and rust-proof. *New nylon bearings make operation smoother and quieter.*

"Multi-Stop" action is available in wood rollers for standard size windows or metal rollers for extra large windows.



A nationwide network of branches means fast, expert light control service. A phone call will bring an expert in school installations to help solve your problems.

JOANNA WESTERN BRANCHES

549-551 Whitehall St., S.W.
Atlanta 3, Georgia
Main 4527

81 Washington St., N.
Boston, Mass.
Lafayette 3-1303

701 Seneca Street
Buffalo 10, New York
Wash. 5182

1231-49 E. Lafayette Ave.,
Baltimore, Maryland
Saratoga 3240

205 West Fourth Street
Cincinnati 2, Ohio
Cherry 6263

648 Huron Road
Cleveland 15, Ohio
TO 1-7087

80 East Long Street
Columbus 15, Ohio
Capital 4-6983

1025 Brush Street
Detroit 26, Michigan
WO 2-7665

812 Jefferson Street
Hoboken, New Jersey
Rector 2-3840

546 South Meridian Street
Indianapolis 25, Indiana
Plaza 8377

2674 North 53rd St.
Milwaukee, Wisconsin
Hilltop 5-2273

400 First Avenue N
Minneapolis 1, Minnesota
Lincoln 0737

313 South Eleventh Street
Omaha 8, Nebraska
Atlantic 4282

2545 North Broad Street
Philadelphia 32, Pennsylvania
Baldwin 2-9000

1627 Penn Avenue
Pittsburgh 22, Pennsylvania
AT 1-4842

165 St. Paul Street
Rochester 4, New York
LO 6644

1124 Washington Avenue
St. Louis 3, Missouri
GA 1-4232

WILLIAM VOLKER & COMPANY BRANCHES

1700 Cockrell Street
Dallas 2, Texas
Randolph 7215

1435 Wazee Street
Denver 17, Colorado
Tabor 5-7211

512 W. Paismo Drive
El Paso, Texas
3-8435

1103 Goliad Street
Houston 13, Texas
Preston 3307

Main, Second & Third Sts.
Kansas City 10, Missouri
Victor 1672

2301 East Seventh Street
Los Angeles 23, California
Angelus 6131

4 East Grand
Oklahoma City 2, Oklahoma
Forest 5-9384

2800 N. W. 29th Street
Portland 10, Oregon
Broadway 5434

1773 So. Second West St.,
Salt Lake City 4, Utah
84-4471

210 Probandt Street
San Antonio 4, Texas
Capital 7-2474

631 Howard Street
San Francisco 5, California
Exbrook 2-5727

1000 Leonora Street
Seattle 1, Washington
Elliot 7560

North 722 Division St.,
Spokane 11, Washington
Empire 7701

801 East Skinner Street
Wichita 11, Kansas
Amherst 2-5448

Joanna Western Mills Company

★

EXECUTIVE OFFICES,
ARCHITECTS AND INSTITUTIONS
SERVICE DEPARTMENT:
22ND AND JEFFERSON STREETS,
CHICAGO 16, ILLINOIS

NEW YORK SALES OFFICE: 261 FIFTH AVENUE, NEW YORK 16, NEW YORK • EXPORT OFFICE: 1 EXCHANGE PLACE, JERSEY CITY 2, NEW JERSEY, U.S.A.

Western Distributor: WILLIAM VOLKER & COMPANY
Main at Third Street, Kansas City 10, Missouri

Joanna Western Cloth Window Shades and Joanna Western Standard Rollers are manufactured by Joanna in their modern facilities located at Joanna, South Carolina; Chicago, Illinois and Ogdensburg, New York.



At Last!

Kirsch Day BLIND

A PRACTICAL "BROWNOUT" BLIND *for Audio-Visual Locations*





INSTANT, SMOOTH-OPERATING ACTION.

- Infinitely-variable control of light from full-open "daylight" position to 94% "brownout" condition, ideal for audio-visual purposes.*
- Blind fully surrounded by U-shaped light-block channel of substantial metal, beautifully fabricated, which prevents leakage of light, and which . . .
- Can be finished to match or harmonize with the blind or with the woodwork or decorative scheme.
- Highest quality components, workmanship and finish in every respect.

* darkness is usually not desired.

Long needed, now finally available—and at a cost which permits immediate broad application! This revolutionary development, using standard Kirsch *Sunaire* Venetian Blind parts, makes it easy to achieve *controlled brownout* . . . at the pull of a cord. Can be added, *at modest cost*, to existing installations of Kirsch *Sunaire* Venetian Blinds!

DEPENDABLE PRODUCT BY KIRSCH COMPANY

A New... Better... Quicker w

AMONG THEIR MANY APPLICATIONS...

Projection Rooms – Auditoriums in...

SCHOOLS—CHURCHES—CLUBS
INSTITUTIONS—COMMUNITY HALLS
PRODUCING STUDIOS—SALESROOMS

Specialized Locations in...

HOSPITALS—LABORATORIES
DOCTORS' OFFICES
Home Bedrooms and Lavatories

THE EASY, SIMPLE WAY TO DARKEN ANY ROOM... NO DRAPERIES REQUIRED



FULLY OPEN — "CONVENTIONAL" In this, and other positions with the slats approximately horizontal, the Kirsch "Nite-in-Day" closely resembles a handsome Kirsch *Sunaire* Venetian blind. There's nothing freakish or complex about the Kirsch *"Nite-in-Day"*... simple and smart... it complements the finest interior decorative scheme.

KIRSCH "Nite-in-Day" BLIND

A Quality Product: SUBSTANTIAL • EFFICIENT • DURA

SIZES

Can be made to fit any window from as narrow as 28 inches to as wide as 12 feet; to any normal length of any window.

LIGHT-BLOCKING CHANNELS

Properly fabricated of substantial U-shaped metal, to completely surround the blind and prevent leak-by of light. Can be painted to suit the decor.

COLORS

Dark green is recommended for the bottom sides of the slats, which face inside when the blind is closed. For the other side, choice of a wide range of lighter colors, to combine beauty with reflective characteristics.

SLATS

Extra wide S-shaped aluminum slats... same as in famed Kirsch *Sunaire* Venetian blinds... are the basis of the unique performance of *"Nite-in-Day"*. As in *Sunaire*, they provide superior light diffusion, overlap and closure.

*Patents Pending

BLIND HEAD

A rolled-steel housing 2⅜₁₆ inches deep by 2½ inches wide. Strong, with reinforced edges. Beautifully finished in baked enamel; no visible fastenings, or protruding parts.

END PLATES

These support the lock and tilt mechanisms and reinforce the headmember ends. They provide wedge-lock assembly of the blind without other fastenings.

TAPES

Dark colors are preferable. Strong twin-ladder tapes are used—of tightly-woven long-staple cotton, or of nylon if preferred.

CORD AND LOCK

Cord color should match the tapes. Tightly-braided best quality cotton cord is standard; nylon if specified. A new, positive, "no-crash" lock action facilitates *raising* and *lowering* the blind. Serrated-roller type; can be installed to operate from either left or right side of window.

COMPONENTS

All parts except the light-blocking [illegible] standard Kirsch *Sunaire* Venetian blind [illegible]... simple, smoother-operating, and [illegible] quality... can be easily, quickly [illegible] accidentally damaged.

Note that regular Kirsch Sunaire "Venetian" [illegible] converted to "Nite-in-Day" blinds of a [illegible] saving over the cost of an entirely new [illegible]

TILTING MECHANISM

Conventional worm gear mechanism, [illegible] end plate. Self-adjusting leveling device.

BOTTOM RAIL

Stiff, reinforced rolled steel, ⅜" x 2⅛" [illegible] standard *Sunaire* extra bottom "[illegible]" buffer end-caps.

FINISH

Standard Kirsch alkyd enamel, infra-red [illegible] glassy-hard smoothness.

© Copyright 1955

A CONTRIBUTION BY KIRSCH — IN RECOGNITI

to DARKEN Rooms at Will!



COMPLETELY CLOSED — FOR DARKNESS

A simple pull on the "tilt" cord causes the *extra* series of slats to fall into *full-overlap* position against the slats of the conventional series. Result —the Kirsch "*Nite-in-Day*" blind then excludes 94% of the entering light, even on bright, sunny days, according to light-meter readings taken ten feet from the window. A U-shaped metal channel completely surrounds the blind on *all sides*, to prevent leakage of light.

PARTLY OPEN — FOR LIGHT CONTROL

The Kirsch "*Nite-in-Day*" blind affords an infinitely-variable adjustment of light reflection, diffusion and distribution to eliminate eye strain and glare, and also provides ventilation. The S-shaped slats ensure unmatched privacy in *combination with* admission of light and air, when desired.

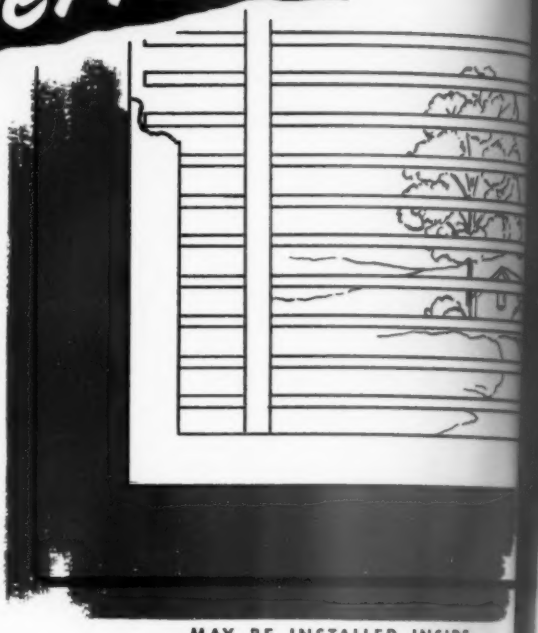
The need for an *attractive* "double-duty" blind that really *darkens* rooms for the ...ing of films, or for other purposes, has ...g been recognized by teachers, doctors, ...jectionists, club and school officials, archi...cts, and others. That the Kirsch "*Nite-...Day*" blind fills this need most satisfac...torily is a fact to which owners can already attest.

...e Kirsch "*Nite-in-Day*" blind is "new" ...y in being now made generally available, ...or widespread installation by licensed ...sch fabricator-distributors. Prior to re...ease, the product was thoroughly tested; ...as installed in a number of representative ...—and exacting—locations. It has been ...nd gratifyingly acceptable on every count ...of appearance, efficiency, ease-of-opera...n, and durability. In consequence, it can be specified and purchased with ...full confidence of enduring satisfaction.



...F GROWING AUDIO-VISUAL REQUIREMENTS

Installed by Experts!



MAY BE INSTALLED INSIDE
OR ON THE FACE OF WINDOW CASING



SIMPLY • QUICKLY • EFFICIENTLY

Kirsch "*Nite-in-Day*" blinds are installed only by carefully selected and fully qualified factory-licensed fabricator-distributors or their appointed dealers. Regardless of the age—or newness—of the building, the type of construction, or the shape of the windows, these skilled and resourceful experts can devise ways and means to bring you the advantages of the unique "*Nite-in-Day*" blind. . . through *their* ingenuity, rather than your own.

Kirsch "*Nite-in-Day*" blinds can be installed inside the window casing, where appropriate, or they may be affixed to the face of the window casing, or even to the wall around the window if necessary.

Any Season is the "Right Season"...
No Class or Work Interruption Necessary!

Fortunately, both the measuring of the windows for Kirsch "*Nite-in-Day*" blinds, and their subsequent installation require little time "on location." The measurements for a multi-window installation can be made in an hour or two at either end of the busy day; the installation can be timed in similar manner, or can be performed over a week-end. (The exacting work of fabricating the blinds to fit each specific window is done in the shop.)
Since no time need be lost from classes or work, and there is no mess or "construction," ANY time is the "right" time to install Kirsch "*Nite-in-Day*" blinds. *Why wait?*

The obvious value of Kirsch "*Nite-in-Day*" blinds so far outweighs their cost that approval of the expenditure is usually quickly obtained. After all, this is one case where, literally, "Nothing else will do." There is simply nothing "like" the Kirsch "*Nite-in-Day*" blind . . . it makes any room a *projection* room!

Free Estimates Cheerfully Given

Any of the competent experts who install Kirsch *Sunaire* Venetian blinds in your area will be pleased to estimate on the new Kirsch "*Nite-in-Day*" brownout blinds, without obligation. Consulting architects, builders, and school authorities will—in many communities—find these suppliers listed in the Yellow Pages of their telephone directories under VENETIAN BLINDS, Kirsch *Sunaire*. Or an inquiry to the manufacturer will bring a prompt reference to the nearest source.

MANUFACTURED BY

Kirsch COMPANY • STURGIS, MICH.

WORLD'S LARGEST PRODUCERS OF DRAPERY HARDWARE, VERTICAL AND HO

LEVOLOR

TRADE MARK OF LEVOLOR LORENTZEN

presents

BLACKOUT

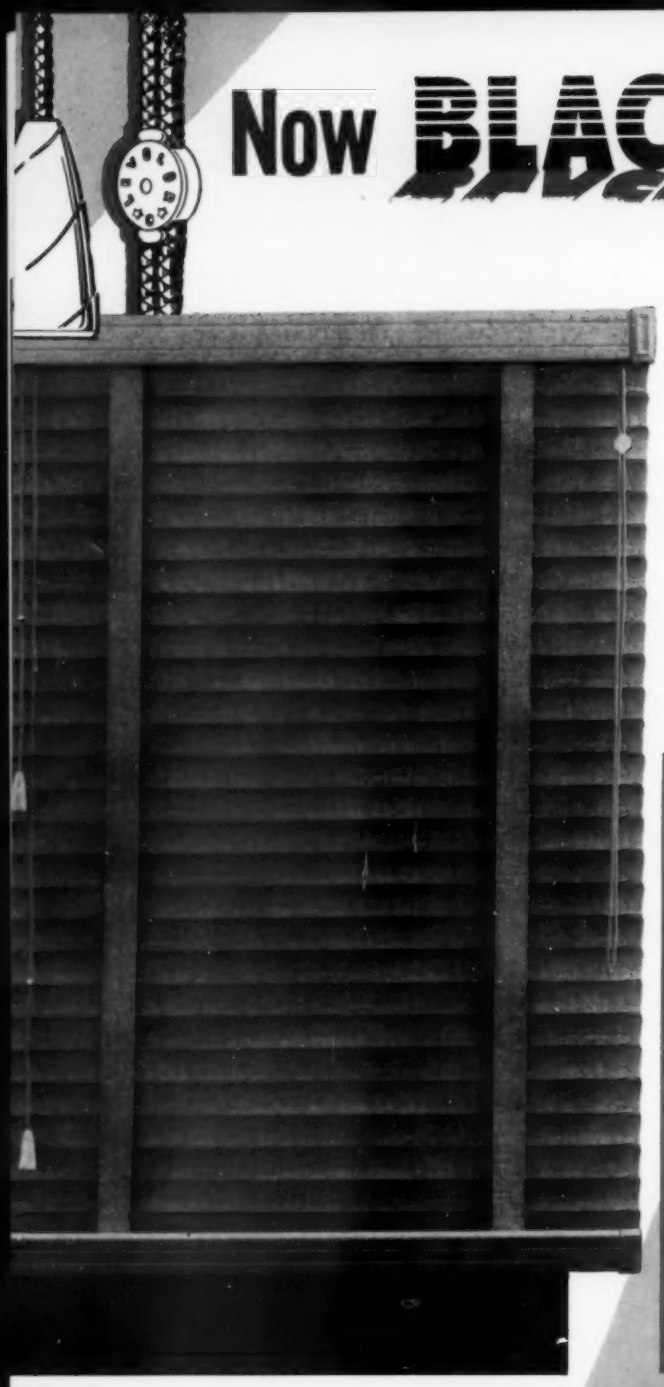
AN AUDIO-VISUAL BLIND, SCIENTIFICALLY DEVELOPED
TO GIVE MAXIMUM CONTROL OF ROOM DARKENING

COPYRIGHT 1955-56

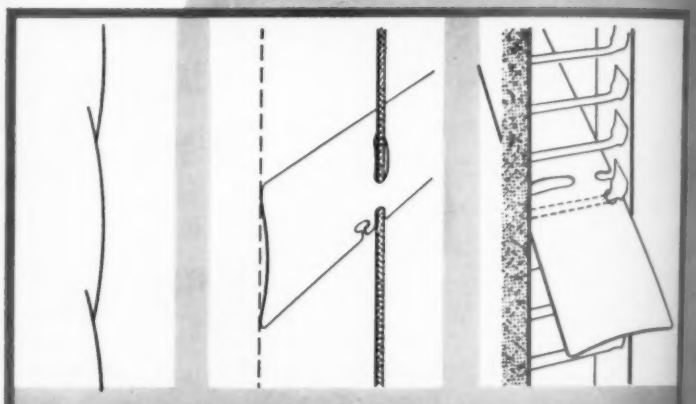
LEVOLOR LORENTZEN, INC. • 720 MONROE STREET • HOBOKEN, NEW JERSEY



Now BLACKOUT your rooms



- Gives maximum control over room darkening.
- For sparkling screen projection and television reception.
- Makes any room a theater in a matter of minutes.
- Custom made by franchised LEVOLOR manufacturers.



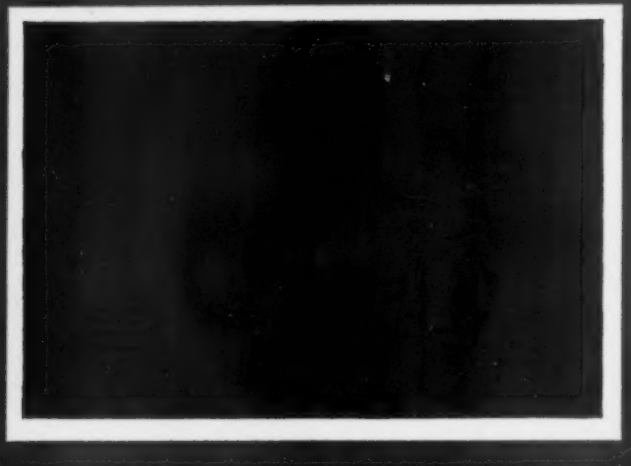
Each slat snugly overlaps the other to seal out light infiltration.

The position of the rout hole and a cord notch in the slat allow movement of the slat to a vertical position under the action of the new interlock between the slat and the cross tape.

BLACKOUT blinds are FLUTTER-PROOF. The special shaped cross tape is locked into a hole in the slat.

YOU CHOOSE YOUR OWN LIGHTING . . .

For maximum room darkening, the BLACKOUT blind should be fully closed.

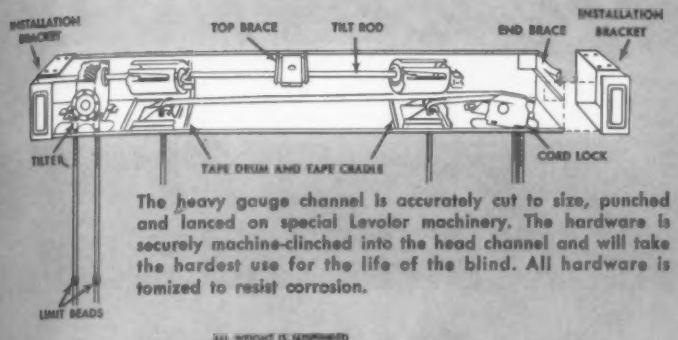


For semi-darkening and diffused light, tilt slats upward until the degree of darkness desired is obtained.

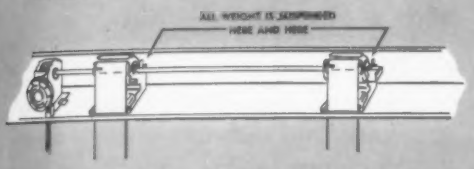


with this LEVOLOR Venetian Blind

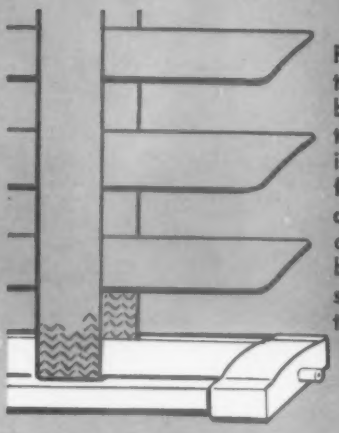
TRADE MARK OF LEVOLOR LORENTZEN



The heavy gauge channel is accurately cut to size, punched and lanced on special Levolor machinery. The hardware is securely machine-clinched into the head channel and will take the hardest use for the life of the blind. All hardware is tomized to resist corrosion.



The tilter operates as an independent unit and has only one function —to tilt the Blinds. All weight is suspended from the tape drums which turn in the tape cradles, offering minimum friction, thus the entire weight of the blind exerts no pressure on the tilter and gives effortless operation to the heaviest blind.



Formed in the shape of a tripled "U," this extra gauge bottom bar gives rigidity plus the needed weight for lowering the blinds. Tapes are fastened **inside** the bar — an assurance against loose clips or sharp edges. The Levolor bottom bar presents one smooth, even surface from end to end.

LEVOLOR BRAND ALUMINUM SLATS



The sharpest bend won't break it.

TOUGH—REAL TOUGH—BUT NEVER BRITTLE. Primary aluminum—cold rolled to compress every fiber into tough, resilient strength. Bend it sharply at the rout holes — and LEVOLOR slat stock will not break because it is tough, but never brittle.

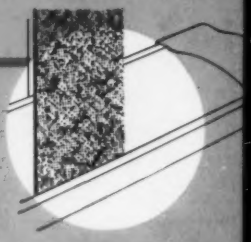
ASSURES PERFECT CLOSURE. Inch for inch, foot for foot, every LEVOLOR slat is a full two inches wide, without twist or bend. This assures the proper overlap and smooth fit of the slats necessary for perfect closure.



Uniformly two inches wide.

THE LEVOLOR CATALYTIC FINISH. Resists corrosion, chipping and marring — because the base metal is etched — back cut, so the base coat is literally anchored to a million tiny crevices. Just as a cabinet worker back cuts a joint to make it hold, this Catalytic Process etches millions of such tiny cuts into the base metal to give a solid foothold to the base coat. It's a finish that's on to stay.

LEVOLOR PLASTIC TAPE



Developed in Levolor's own laboratories and manufactured by Levolor. Levolor plastic tape has been pre-tested under the severest conditions and has withstood tests far in excess of normal requirements.

In appearance it is new and refreshing with fabric patterns that have eliminated the objectionable plastic appearance.

LEVOLOR plastic tape is strong, yet soft and pliable — bundles neatly when the blinds are raised and straightens nicely when they are lowered.



The ladders will not pull under the severest strain.

LEVOLOR NYLON CORD

Braided in Levolor's own mill to rigid specifications, LEVOLOR nylon cord assures unmatched uniformity in quality. Smooth, silent operation and long lasting beauty make the specification of LEVOLOR nylon cord a wise investment.



Will tear either direct

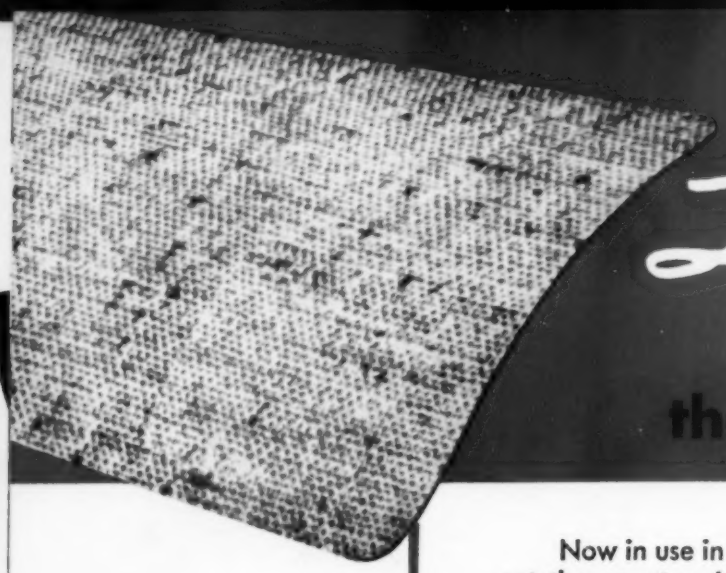
For darkening of screen area, fully close blinds at screen area, tilt slats upward in area requiring diffused light.



BLACKOUT blind functions as a conventional Venetian Blind when not in use for audio visual.



LEVOLOR LORENTZEN, INC. • 720 Monroe Street, Hoboken, New Jerse



Linen Fresh

a VENETIAN BLIND that requires less care

Now in use in leading schools and outstanding institutions throughout the country, LINEN FRESH Venetian Blinds have met with great favor because of their ability to minimize cleaning. Though dust may be on this remarkable blind, it does not show, and between regular cleanings the blind always looks fresh and clean. LINEN FRESH Venetian Blinds have a non-gloss finish that produces a pleasant light softening effect with complete absence of glare.

TRY THIS TEST

Take a conventional white slat with a glossy finish. Powder it with any ordinary dust and then shake off the excess. Make a mark on the dust and see how obvious it is. Try the same test on LINEN FRESH, the dust is barely apparent.



Dust mark on conventional white slat

Dust mark on Linen Fresh



The South Grove School, of Syossett, L. I.
a Linen Fresh Installation
Arch.: Louis E. Jallade • Gen. Cont.: Fischer Malik, Inc.



The New Statler Hotel at Hartford, Connecticut chose "LINEN FRESH BRAND" in Green.
Arch.: William B. Tabler
Gen. Cont.: George A. Fuller Co.



City County Memorial Hospital in Dallas, Texas.
Linen Fresh in Gray.
Arch.: Roscoe P. DeWitt
Gen. Cont.: Robert E. McKee
General Contractor Inc.
Administrator-Consultant: Albert H. Scheidt



The largest Venetian Blind in the world, installed at Radio City, New York, Linen Fresh in Gray.

LINEN FRESH BRAND VENETIAN BLINDS CAN BE HAD IN A BLACKOUT BLIND

LEVOLOR

TRADE MARK OF LEVOLOR LORENTZEN

VENETIAN BLINDS

720 Monroe Street • Hoboken, New

COLUMBUS COATED FABRICS CORPORATION

Dept. U-56, Columbus, Ohio



BONTEX

window shade cloth



Bontex Flame-resistant Shade Cloth will not support a fire

Bontex shade cloth controls daylight properly for every school need. Provides better light without glare. Tough, durable pyroxylin or vinyl, fused with a high-thread-count cloth base, enables Bontex to withstand hard use and abuse. Bontex sheds rain, snow, wind — will not pinhole, fray or crack. Colorfast to sun and water. Colors are clear and uniform.

Scrubbable, cleans like new! The beautiful, non-porous Bontex surface repels dust and dirt. Can be scrubbed 20 times or more without harm to its original finish. Surpasses government specification CCC-C-521b TYPE III & IV and rates excellent in quality tests. Approved for use in such metropolitan school districts as Chicago, Philadelphia, St. Louis, Minneapolis.

Many types of Bontex. Shades for full range daylight control. Bontex Darkening Shades for showing slides or films. Bontex Black excludes all light. Bontex Flame-resistant shade cloth protects for life of the shade cloth — fire retardant materials will not wash out or wear out.

Real Economy. Durable Bontex lasts longer, eliminates frequent replacements, reduces maintenance costs, and makes real savings.

Write for Sample Book

Shows solid and duplex colors, corded designs, utility and decorative shades for schools and every type of building. Book free to school officials and architects.



WALL-TEX

washable wall fabric



In York Tests for removing these stains, Wall-Tex rated excellent

Wall-Tex makes classrooms and all school rooms more inviting, requires little attention, keeps its new look for years, avoids frequent redecorating. The Wall-Tex cloth base is overlaid with successive coatings of oil colors. The coatings are baked on for extra durability and the designs are printed in durable, fade-proof colors.

Washable, actually scrubbable. In York laboratory tests, Wall-Tex withstood 2000 scrubbing strokes without signs of wear or deterioration.

Controls plaster cracks. The sturdy Wall-Tex cloth backing keeps plaster cracks under control, protects walls against scuffs and mars, saves repair expense.

Fire retardant. York laboratory tests show that Wall-Tex, hung on plasterboard, did not support a fire more than one second after flame was extinguished or removed.

Designs and solid colors. Wall-Tex is available in scores of designs, textures, weaves, suitable for schools and other public and private buildings; also in a full range of newest solid colors.

Pre-trimmed, easy to hang. Wall-Tex comes 24 inches wide, pre-trimmed with true edges for easy hanging and accurate matching of pattern.

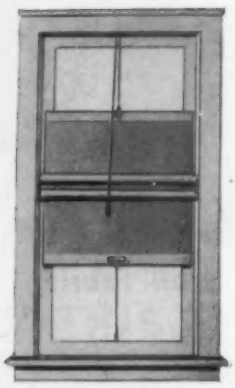
Write for name of your nearest Wall-Tex distributor.

New heavy-duty Wall-Tex vinyl wall coverings

For applications where a practically indestructible wall covering is desired. Withstands continuous punishment in corridors, cafeterias and other service areas. The vinyl surface is tough and durable, stainproof and fire retardant — requires minimum care and maintenance.

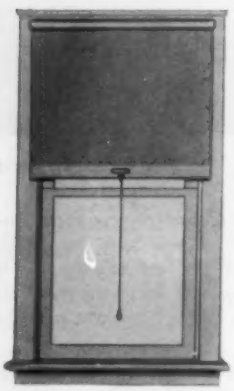
FORSE MANUFACTURING COMPANY

223 Sullivan Avenue
St. Louis, Missouri



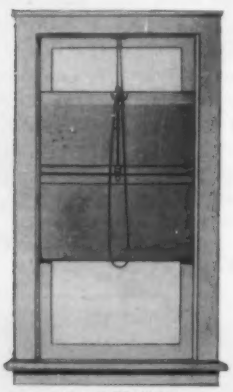
No. 5 DUO-ROLL

Duo-Roll Shades permit shading upper and lower sections of windows independently of each other. Upper shade is adjusted by a long cord and lock pulley at the top of the window. A metal light shield covers the space between the two rollers.



No. 3 SINGLE ROLL

Recommended for small windows. Also available in Pull-up Type with lock pulley at top of opening or sash. Easily installed on French, austral, tilting sash and transom windows.



No. 2 FOLDING

Folds and adjusts up and down by a continuous cord and two lock pulleys. Ordinary-size shades have a slat at top and bottom and two intermediate slats. Long shades have additional intermediate slats.

For over 35 years, Forse Wearproof Shades and Draperies have been used in schools, hospitals, churches, auditoriums, office buildings—wherever quality, economy and long trouble-free service are paramount requirements. They are built to stand up under hard constant use and to eliminate the expense of replacement for many years. All Forse Wearproof Shades are guaranteed for 10 years. Many users report that their Forse shades are still giving satisfactory service after 20 years or more.

Advantages

Low first cost — Low maintenance cost
No cracking or checking
Pre-shrunk — Fast colors
Made to measure
Guaranteed for 10 years

Write for literature and material samples

Forse Wearproof Fabrics

are the finest, most durable shade materials available. They are made from long staple canvas type cotton cloth, specially processed and dyed to our specifications, and weighing 8 oz. or more per sq. yd. The materials contain no paint, plastic or loading of any kind, can never crack or check and will retain their color and texture for many years. You can wash or dry clean them repeatedly. Available in decorator colors, Forse translucent fabrics will admit soft pleasant light while keeping out the glare.

Forse Wearproof Darkening

is extremely close weave 10 oz. cloth, specially treated and dyed to provide best quality yet reasonably priced darkening shades and draperies. Its darkening properties are developed from the special tight weave and the dyes used and the finished fabric contains no filler, paint or coating. Forse Wearproof Darkening is practically light proof, is soft and pliable at any temperature and will retain these qualities for the life of the fabric. Available in attractive colors to harmonize with your other appointments.

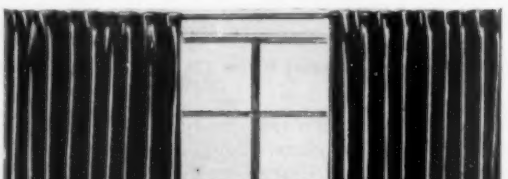
Forse WEARPROOF Shades

The Shades that Refuse to Wear Out

DARKENING DRAPES

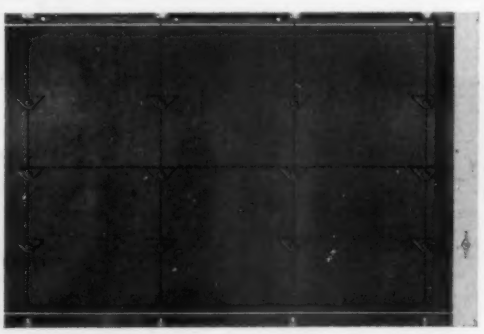
These draperies are made from Forse Wearproof Darkening Materials. They will provide effective and attractive installations over glass block and other wide windows and window groups. Generous overlaps are recommended at top and bottom of windows and they should usually be several feet wider than the openings to be covered.

Translucent draperies for control of light and glare are also available.



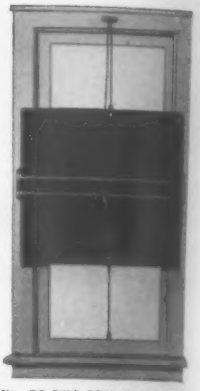


Above—FOLDED Below—OPEN



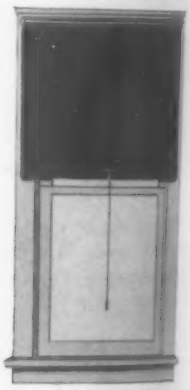
No. 10 FOLDING DARKENING

A most economical shade for darkening large windows. Single shades will cover windows up to 15 ft. wide. Very wide windows (over 15 ft.) require multiple-unit overlapping shades. No. 10 shades hang snugly against wall or casings and provide an excellent darkening installation. They are easily raised and lowered by cords and secured in the desired position by cleats at the side or bottom of the windows. When not in use, they fold at the top of the windows where they cannot be damaged. Whenever possible, No. 10 Darkening Shades should overlap openings at least 6 inches on each side. The height should be about 12 inches greater than opening height and they should be attached about 9 inches above the top of the window openings.



No. 50 DUO-ROLL DARKENING

Can be used as a multi-purpose shade when darkening requirements are not too severe. A good shade for high narrow windows. Space between the rollers is covered by a metal light shield.



No. 30 SINGLE ROLL DARKENING

Excellent for darkening small and ordinary size windows. For best results, the cloth should overlap the openings at least 3 inches on each side. Also available in Pull-up Type with lock pulley at top of opening.



No. 20 FOLDING DARKENING

Similar to the No. 2 Shade. Operated by a continuous cord and two lock pulleys. Sometimes recommended when other shades would be difficult to install due to type of window construction, etc.

ACCURATE METAL WEATHER STRIP CO., INC.

218 East 26th Street, New York 10, N. Y.

DISTRIBUTORS IN PRINCIPAL CITIES THROUGHOUT THE UNITED STATES

Efficient Weatherstripping for all types of wood and metal windows and doors.

Various types and sizes of "ACCURATE" METAL WEATHER STRIPS places us in an ideal position to cooperate with school Architects and Executives in meeting their requirements.

TYPES AND QUALITY OF MATERIALS: Zinc and Bronze materials are ordinarily used depending upon atmospheric conditions.

THE COMPANY: The "ACCURATE" METAL WEATHER STRIP COMPANY has been manufacturing metal weather-strips for over 50 years and today it is outstanding in the industry.

MANUFACTURING FACILITIES: Owing to unusually efficient manufacturing facilities, personal supervision and complete control of every step in fabrication, purchasers of "ACCURATE" METAL WEATHER STRIPS are assured of prompt service and dependable workmanship.

ARCHITECTURAL SERVICE: Satisfactory results from weather strip depends upon three major factors:—(1) quality of equipment, (2) selection of equipment designed to meet the individual conditions and requirements, and (3) proper installation. Where time permits, we strongly urge that you permit us to submit complete and specific recommendations.

"ACCURATE" SERIES NO. 30 EQUIPMENT RECOMMENDED FOR SCHOOL WINDOWS

Heavy Double Hung School Windows Require Substantial Weather Strips

Large double hung windows such as those used in schools require a weather strip designed especially for this type and size of window. It is a waste of money to specify a light weight strip which is not designed for this type of heavy-duty service.

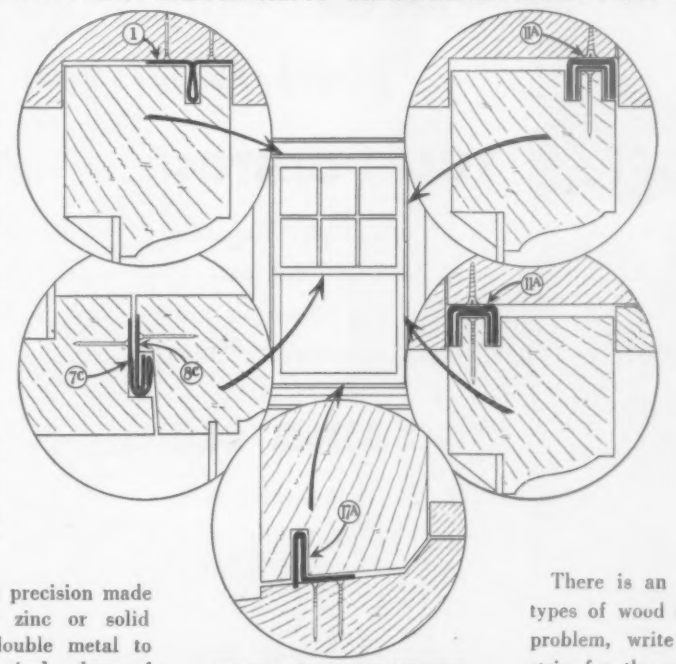
"Accurate" Series No. 30 Equipment

This series is designed especially for schools. It will stand up and take considerable abuse due to its shape and the heavy gauge metal used in its manufacture.

All parts of the equipment are precision made of heavy gauge special temper zinc or solid bronze as specified. It has a double metal to metal channel slide on the vertical edges of sash. The channel on the pulley stile is a heavy 16-gauge channel in which the sash channel slides. As the channels operate metal to metal, they have to operate perfectly as there is no chance for the mechanic to install them in any other way.

It will always hold its contact if applied with screws and not nails.

The narrow channel makes it possible to get to the sash weights easily. If it is necessary to remove the channel, it is rigid enough to hold its shape and can be replaced in the same position by using the same screw holes.



SERIES NO. 30 EQUIPMENT

For Other Types of Windows

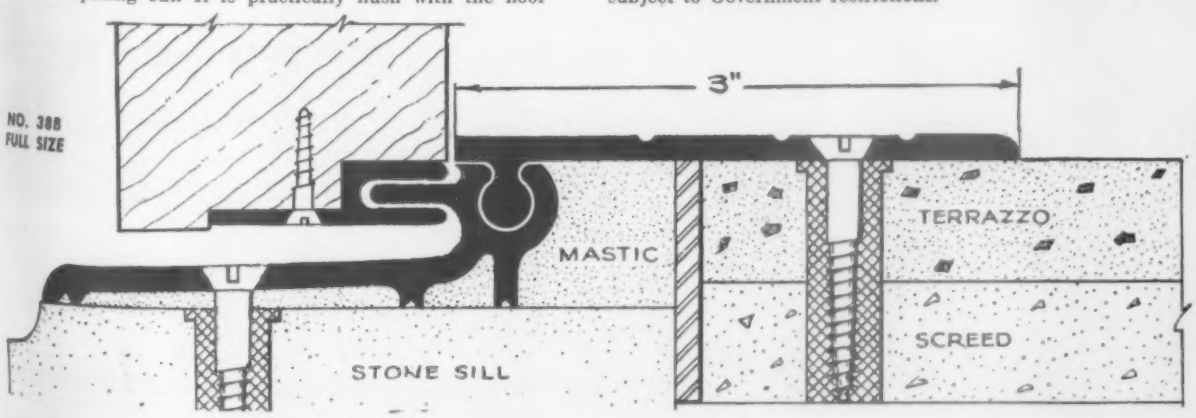
There is an "Accurate" weather strip for all types of wood or metal windows. If you have a problem, write to us for the proper weather strip for the condition.

ONE OF MANY TYPES OF "ACCURATE" EXTRUDED BRONZE SADDLES

"Accurate" also specializes in extruded bronze door saddles. Each saddle is designed for a specific condition and a saddle can be selected for practically any door condition.

"Accurate" No. 38B extruded bronze saddle is designed for exterior doors opening out. It is practically flush with the floor and its flat top surface does not interfere with the use of panic bolts. This saddle is also available in aluminum.

A complete series of saddles for use with exterior sliding doors will be found in our catalog in Sweet's. Availability of all metals subject to Government restrictions.



WESTERN WATERPROOFING COMPANY, INC.

A Missouri Corporation And Its Affiliate
RESTORATION COMPANY, INC.

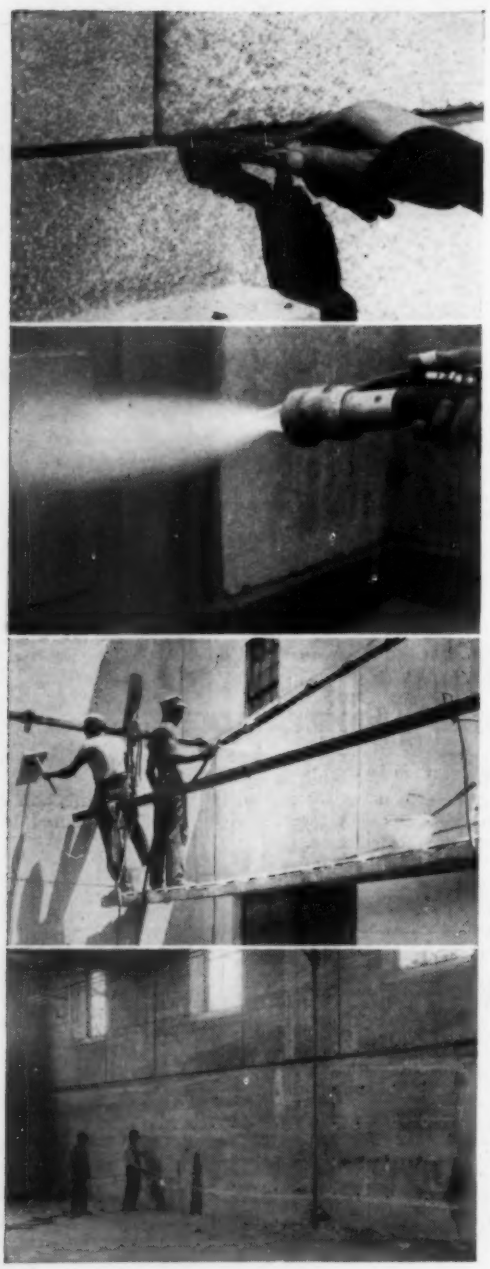
1223 Syndicate Trust Bldg., St. Louis 1, Missouri

Contractors and Engineers • Nationwide Service

STOP Water Damage...

Let WESTERN WATERPROOFING CO., Inc.

Weatherproof Your Buildings Now!



TUCKPOINTING

... with Dilato* Expanding Mortar. This treatment includes removal of all crumbling and deteriorating mortar and replacement with DILATO expanding mortar. Prevents moisture penetration beneath masonry surface, the first step in building decay cycle.

BUILDING CLEANING

... Western-developed Wet Aggregate* Process and other methods available, including steam, wet or dry sandblasting. Removal of grime deposits restores your building's original color and beauty.

CONCRETE RESTORATION

... with Resto-Crete* or gun-applied concrete. An above-ground treatment for deteriorating concrete, found principally on abutments, bleachers, gymnasiums, stadia and retaining walls.

SUB-SURFACE WATER PROTECTION

... with Ironite*, a metallic waterproofing material for surfaces in contact with earth. Protects basements, pools, underground passageways against hydrostatic heads.

All work done under contract, fully insured and guaranteed. No materials for sale.

Write for consultation, inspection and estimate.

building restoration

remedial waterproofing



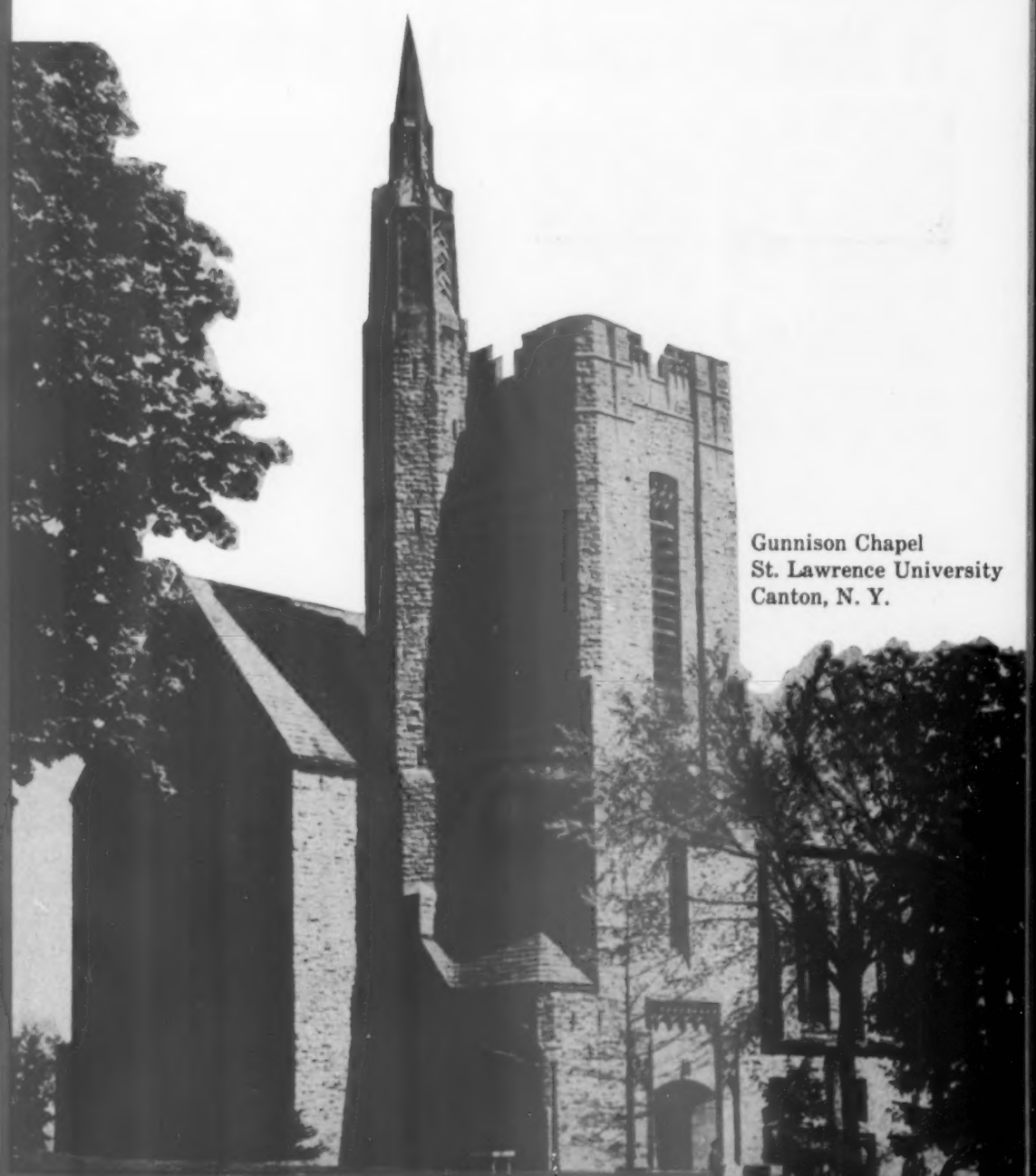
Massachusetts



Missouri



Texas



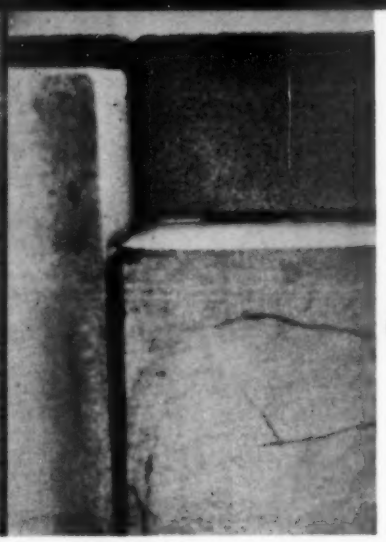
Gunnison Chapel
St. Lawrence University
Canton, N. Y.

CONTRACTING DIVISION
A. C. HORN CORPORATION

Main Office—10th Street & 44th Avenue
Long Island City 1, N. Y.
Subsidiary SUN CHEMICAL CORP.

Brick masonry disintegration due to water-penetration through cracks and voids. **1**

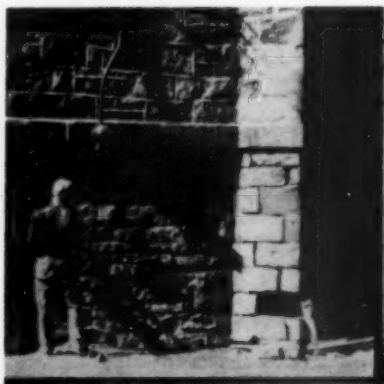


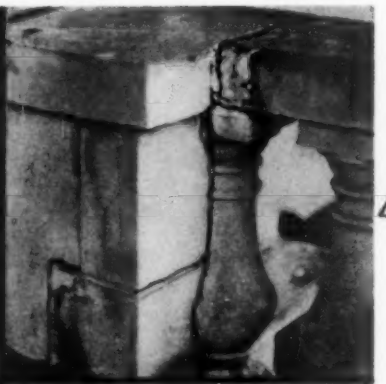


2 *Open joints in limestone due to failure to repoint, permit further deterioration.*

is this the condition of your building?

Random stone masonry disintegrated due to lack of proper maintenance. **3**

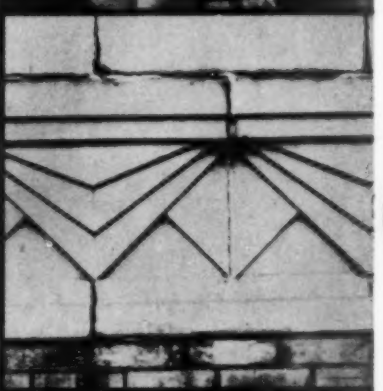




4 *Cast stone masonry in neglected condition. Restoration and pointing needed.*

Terra-cotta cornice disintegrated and spalled. In hazardous condition. **5**





6 *Terra-cotta trim and brick masonry disintegrated due to lack of pointing in time.*

Valuable granite facing ruined by previous improper pointing methods. **7**





8 *Defective caulking allows entrance of moisture to ruin interior decoration.*

TYPICAL HORN JOBS



Ohio



Louisiana



Oklahoma



1 *Final treatment of brick masonry after Horn vibro-caisson grouting process.*



2 *Complete restoration of fine random stone masonry by skilled mechanics.*

horn methods we use to assure results



3 *Repointing prepared joints with J-O-I-N-T-E-X balanced repointing mortar.*



4 *Our skilled crews use modern equipment for restoration of stone masonry.*



5 *Mechanical saws used wherever possible, to obtain clean sharp lines.*



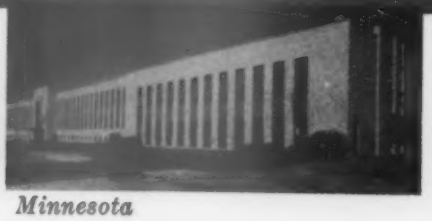
6 *Proper caulking is an important part of each waterproofing job we do.*



Rhode Island



Ohio



Minnesota

IN EVERY STATE



Massachusetts



Tennessee



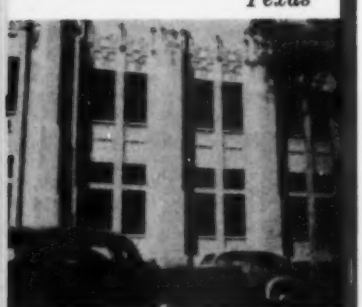
Minnesota



Pennsylvania



Texas



Indiana

School and university jobs by HORN

other references on request

ALABAMA
REYNOLDS HALL, ALABAMA COLLEGE

CONNECTICUT
GEORGE SYKES SCHOOL
HOTCHKISS SCHOOL

DELAWARE
DELAWARE STATE COLLEGE
JOHN B. MOORE SCHOOL
SMYRNA HIGH SCHOOL

GEORGIA
GEORGIA TECH
UNIVERSITY OF GEORGIA
ROBERT E. LEE HIGH SCHOOL

ILLINOIS
GARFIELD SCHOOL
JEFFERSON GRADE SCHOOL
UNIVERSITY OF ILLINOIS

INDIANA
GREENSBURG SCHOOL
VALPARAISO UNIVERSITY

IOWA
CENTRAL COLLEGE

LOUISIANA
BATON ROUGE JUNIOR HIGH SCHOOL
LAKE CHARLES HIGH SCHOOL
MYRTLE PLACE SCHOOL
PROVIDENCE ACADEMY

MAINE
BANGOR HIGH SCHOOL
LEE ACADEMY
MATTANAWCOOK ACADEMY
UNIVERSITY OF MAINE

MASSACHUSETTS
BEVERLY HIGH SCHOOL
BOYS TRADE HIGH SCHOOL
BRADFORD DURFEE INSTITUTE
BRANDEIS UNIVERSITY
GENERAL DRAPER SCHOOL
LAKE VIEW SCHOOL
SUZAN H. WIXON SCHOOL
WELLESLEY COLLEGE

MICHIGAN
GALIEN TOWNSHIP SCHOOL
HAROLD UPJOHN SCHOOL
THREE OAKS SCHOOL

MINNESOTA
CHURCH OF CHRIST SCHOOL
SENIOR HIGH SCHOOL
ST. MARKS SCHOOL
TWO HARBORS HIGH SCHOOL

NEBRASKA
UNIVERSITY OF NEBRASKA

NEW HAMPSHIRE
UNIVERSITY OF NEW HAMPSHIRE

NEW JERSEY
ADVANCED STUDY INSTITUTE, PRINCETON
CHATHAM HIGH SCHOOL
CLIFTON SCHOOL
DENVILLE SCHOOL
DON BOSCO COLLEGE
DREW UNIVERSITY
FRANKLIN SCHOOL
IMMACULATE CONCEPTION SCHOOL
NEWTON SCHOOL
NORTH PLAINFIELD SCHOOL
ST. PETERS SCHOOL

NEW YORK
BUSHWICK HIGH SCHOOL
COLLEGE OF ST. ROSE
CONCORDIA INSTITUTE
DRAPER CENTRAL SCHOOL
DUNDEE CENTRAL SCHOOL
HOLY TRINITY SCHOOL
JUILLIARD SCHOOL OF MUSIC
KINGS PARK SCHOOL
MAHOPAC CENTRAL SCHOOL
PATCHOGUE HIGH SCHOOL
RENSSELAER POLY TECH
SEA CLIFF HIGH SCHOOL
URSULINE SCHOOL

NORTH CAROLINA
NORTH CAROLINA STATE COLLEGE

OHIO
GRACEMONT SCHOOL
JOHN CARROLL UNIVERSITY
JOHN MARSHALL HIGH SCHOOL
LAKE ERIE COLLEGE
NOTRE DAME COLLEGE
RICHFIELD TOWNSHIP SCHOOL
WASHINGTON PARK SCHOOL
WESTLAKE SCHOOL

PENNSYLVANIA
ARTHUR STREET SCHOOL
BRISTOL HIGH SCHOOL
HAZLETON JR. HIGH SCHOOL
LANGHORNE HIGH SCHOOL
PENN STATE COLLEGE
ST. JOHN KANTY COLLEGE
WEST HAZLETON JR. HIGH SCHOOL

RHODE ISLAND
MT. PLEASANT HIGH SCHOOL
NORTH PROVIDENCE HIGH SCHOOL
PERRY SCHOOL
PROVIDENCE SCHOOLS
ST. GEORGES SCHOOL
WARREN SCHOOL

SOUTH CAROLINA
KERSHAW SCHOOL
ROEBUCK HIGH SCHOOL
SOUTH CAROLINA MEDICAL COLLEGE

TENNESSEE
FISK UNIVERSITY
JOELTON SCHOOL
SODDY DAISY SCHOOL
WARNER SCHOOL

VIRGINIA
BENT SCHOOL
LARCHMONT SCHOOL
ST. VINCENTS SCHOOL

WEST VIRGINIA
CHARLESTON PRESBYTERIAN SCHOOL

WISCONSIN
UNIVERSITY OF WISCONSIN
VERONA UNION SCHOOL

over 85,000,000 square feet treated

A Subsidiary of Sun *Chemical Corporation*

Contracting Division

A. C. HORN Corporation

Long Island City 1, N. Y.

WATERPROOFING ENGINEERS AND CONTRACTORS

DIVISIONS OF SUN CHEMICAL CORPORATION

HORN • **HUDSON** • **WILLEY** (paints, maintenance and construction materials, industrial coatings) • **WARWICK** ([illegible] and industrial chemicals) • **WARWICK WAX** (refiners of specialty waxes) • **RUTHERFORD** (lithographic equipment • **SUN SUPPLY** (lithographic supplies) • **GENERAL PRINTING INK** (Sigmund Ullman • Fuchs & Lang • Eagle • American • Kelly • Chemical Color & Supply Inks) • **MORRILL** (news inks) • and **ELECTRO-TECHNICAL PRODUCTS** (coatings and plastics

The THORO System
Protects masonry against water



Masonry protection can be beautiful!

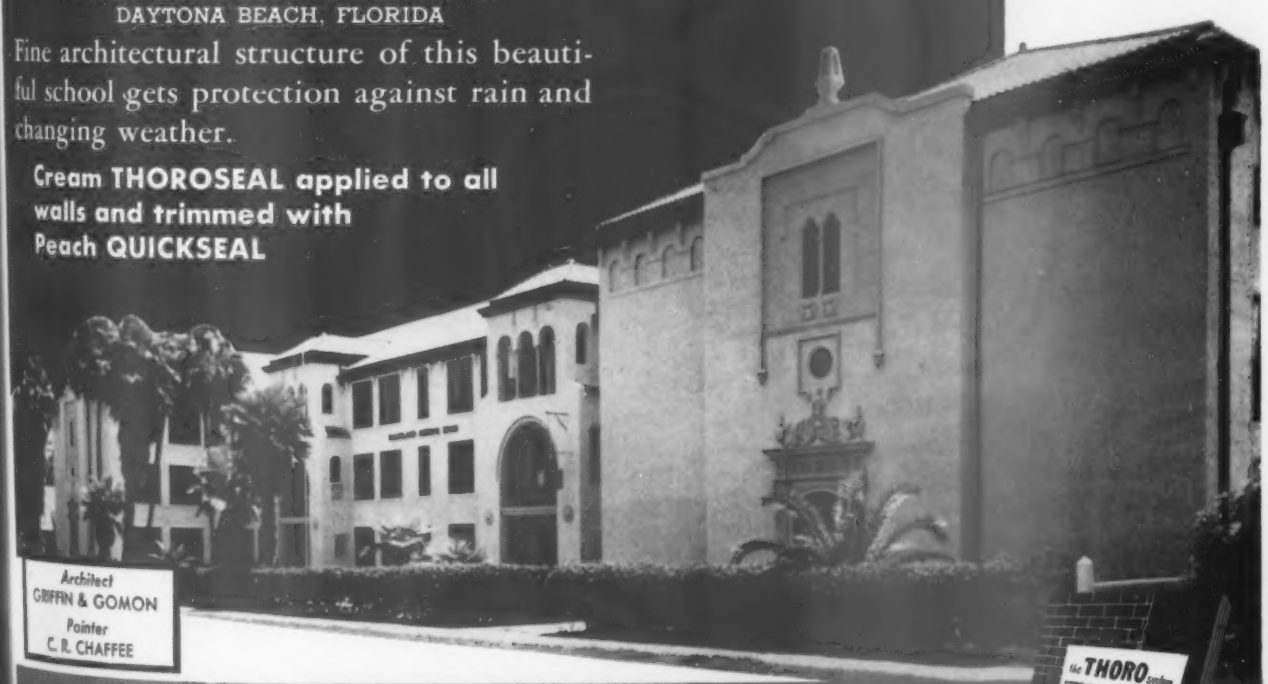
DURABLE RAINCOAT FOR THE CYPRESS STREET SCHOOL, DAYTONA, FLORIDA. The masonry walls of this beautiful new school can endure all weather conditions.

Architects Griffin & Gomon specified a sealer coat of Cream THOROSEAL over masonry first, followed by a beautiful finish coat of Cream QUICKSEAL.

MAINLAND HIGH SCHOOL
DAYTONA BEACH, FLORIDA

Fine architectural structure of this beautiful school gets protection against rain and changing weather.

Cream THOROSEAL applied to all walls and trimmed with Peach QUICKSEAL



STANDARD DRY WALL PRODUCTS, INC.
NEW EAGLE, PENNA.

Write for our 16-page brochure, pictorially describing masonry problems, and specification writer's wall chart.

A. I. A. FILE NUMBERS 7-A-3, 7-B-1, 7-B-2, 3-B-2, 25-B-30, 25-B-26, 25-B-31

PRINTED IN U.S.A.

PHONES: MONONGAHELA 67 OR 1417



Architect—Ernest Ward
Contractor—Selby & Campbell
Painter—Deaver Painting Co.
Springfield, Missouri

Exterior masonry walls of the new Baptist Bible College repel water.

A heavy brush coat of white THOROSEAL protects and adds beauty to the outside masonry walls of this ultra smart college in Springfield, Missouri.

THOROSEALED
means WATERPROOFED

... Economical and extremely durable, THOROSEAL, when applied to masonry construction, bonds itself permanently to the structure, filling and sealing cracks and voids, adding the finishing touch to fine architectural design of the Baptist Bible College.



Standard Dry Wall Products Inc.
NEW EAGLE, PENNSYLVANIA

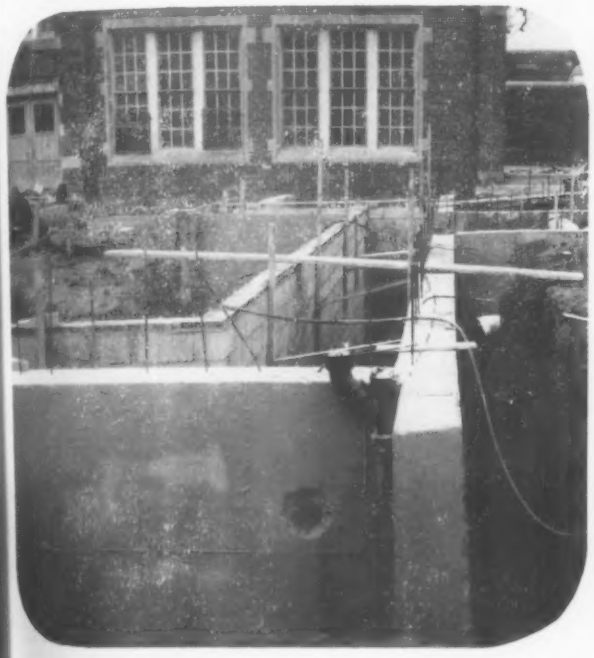
Printed in U.S.A.

Copyright S. D. W.

Firm, Dry Foundation for New Bagley School

Pontiac, Michigan

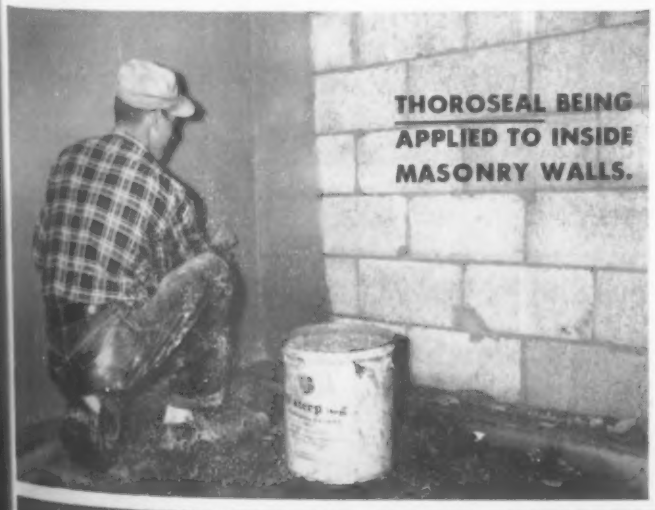
All masonry needs protection and particularly that which is exposed to underground moisture. Professional advisers such as architects, engineers, builders and contractors recommend below-ground walls be sealed with a heavy coat of THOROSEAL.



Contractor, Nolan Gottschall's workmen give two brush coats of THOROSEAL Foundation Coating to exterior foundation walls and tunnel walls. Two coats of THOROSEAL are applied also to the interior walls.

THOROSEAL, specified for Bagley School by Architect William Zimmerman, is shown being applied before top structure is under way.





Inside and Outside

Be sure all water problems are prevented from the beginning of construction. **IF IT'S WORTH BUILDING, IT'S WORTH PRESERVING.** THOROSEAL, applied to both inside and outside foundation wall, assures you of a dry, sanitary school.

STANDARD DRY WALL PRODUCTS, INC.

NEW EAGLE, PENNA.

Write for our 16-page brochure, pictorially describing masonry problems, and specification writer's wall chart.



The THORO System

Corrects or prevents every water problem in masonry

INDEX OF MATERIALS

TYPE	NAME	DESCRIPTION AND USE OF PRODUCT
Protective Wall Coatings and Surface Treatments	WATERPLUG	A quick-set hydraulic cement to stop streams of active water, grouting, filling and anchoring.
	THOROSEAL FOUNDATION COATING	A high type cementitious compound not subject to disintegration when exposed to ground waters. For exterior surfaces of foundations, bridge abutments, pits and all types of masonry below grade exposed to fills or earth embankments. Has exceptional structural strength.
	THOROSEAL, STANDARD GRAY, WHITE AND COLORS	A base coating to fill and seal masonry of all types and equalize the absorption of the various units comprising the surface; to make a more uniform finish of QUICKSEAL; for basement walls and every type of masonry which needs to be sealed.
	QUICKSEAL, SNOW WHITE AND COLORS	A finishing material of distinction and beauty, which, when applied over THOROSEAL base application, completes the sealing of surface; provides maximum decoration and long service.
Vapor Barrier and Plaster Bond	VABAR	A fine quality, cementitious material, prepared ready for use other than the addition of water. Applied to back-up walls of block, tile, brick or other type masonry. VaBar seals the surface and provides a proper bond for gypsum plaster.
Nonshrink Grouting Compound	THORITE	Twenty-minute set patching mortar, to fill holes and blisters in masonry surfaces; prevents further destruction of steel reinforcing. Ideal for scaffold work, as forming is unnecessary. No slump from edges of patch, nonshrink and nonmetallic.
Repairs and Patching Old Floors	BONDFAST PENETRATOR	Nonshrink bonding and penetrating Thorocrome compound for repairing and bonding new surfaces to old concrete. Repairing of floors and other masonry; one pound to each square yard.
Floor Hardener	P & W	A high-quality concentrated chemical, formulated with laboratory exactness, packed for shipment in crystal form, to be dissolved in clean water. Adding additional water as directed, solutions are flushed over concrete surface by means of squeegee, mop or soft broom and produce a hard durable wearing surface, free of dusting and disintegration.

TYPE	NAME	DESCRIPTION AND USE OF PRODUCT
Integral Compound	THOROLITH	Eliminates excessive mixing water in concrete and mortar, increases density, checks capillarity and improves placability. A true Pozzolanic non-shrink plasticizer.
Cement Paint	PEM	Beautiful coating for masonry walls. May be applied to any absorbent type masonry or concrete surface to cover stains, gives uniformity and change. Conforms to Federal Specification TT-P-21. Type II, Class A.
Nonshrink Grouting Compound	THOROSET	A metallic compound for hardening mortar, grouting and bedding; accelerates strength and set.
Repointing and Grouting Mortars	DRYJOINT	A quality material for repointing all types of masonry, nonstaining for limestone, sandstone, etc. Prevents penetration of water, speeds placement and provides greater strength. Standard Gray or White and colors furnished upon request to match masonry.
	D-J MORTAR	A special mortar for grouting and sealing porous mortar joints on smooth type brick walls. Material is scrubbed into joints and over brick and then wiped off, leaving cracks in joints and brick sealed, retains normal brick appearance.
Transparent Sealer	THOROCLEAR	A high-quality product, prepared under exacting laboratory standards, to provide maximum water repellence, without changing appearance of any masonry. THOROCLEAR is invisible; it's water-repellent qualities prevent penetration of moisture into the surface.
Floor and Wall Coatings	THOROLOK BLUE STAR BRAND	A high-quality rubber base floor sealer for maximum decoration and wear. Produced for thoroughly cured and dry concrete or masonry surfaces. Applied in two coats. Available in six attractive colors.
	THOROLOK RED STAR BRAND	A special, high quality tung-oil base product, expressly designed for exterior coating of asbestos siding and shingles. May also be used over brick or tile, terra cotta, sandstone or limestone trim, interior plaster or wood trim. Applied in two coats. Available in six attractive pastel colors.

WATERPLUG TO STOP THE LEAKS

THOROSEAL TO SEAL THE SURFACE

QUICKSEAL FOR BEAUTIFUL FINISH COAT

"BUY THE BEST FIRST"



STANDARD DRY WALL PRODUCTS, INC.
NEW EAGLE, PENNA.

Write for our 16-page brochure, pictorially describing masonry problems, and specification writer's wall chart.

B INTERIOR FINISH

1. Flooring

The Jennison-Wright Corporation	**B–1/Je**
The National Terrazzo and Mosaic Association, Inc.	**B–1/Na**
Uvalde Rock Asphalt Company	**B–1/Uv**
Congoleum Nairn, Inc., Gold Seal Division	B 14
Loxit Systems, Inc.	B 15
The Tile-Tex Division, The Flintkote Company	B 17

2. Stair Treads

American Abrasive Metals Co.	B 12, 13
American Mason Safety Tread Co.	B 16
Melflex Products Company, Inc.	B 18
Wooster Products, Inc.	B 19

3. Wall Tile and Covering

L. E. Carpenter & Company, Inc.	**B–3/Ca**
Metropolitan Brick, Inc.	**B–3/Me**
Natco Corporation	B 20
United States Ceramic Tile Co.	B 21
The Mosaic Tile Company	B 22, 23

4. Acoustical Materials

Dant and Russell Sales Co.	**B–4/Da**
The Celotex Corporation	B 24
Johns-Manville	B 25-28

5. Partitions

Horn Division, The Brunswick-Balke-Collender Co.	**B–5/Ho**
Mills Metal Compartment Co., Division of The Mills Company	**B–5/Mi**
Martin-Parry Corporation	B 29
John T. Fairhurst Co., Inc.	B 30, 31
The Sanymetal Products Company, Inc.	B 32, 33
Wayne Iron Works	B 34, 35

6. Chalkboards, Corkboards and Metal Trim

Bangor Cork Co.	**B–6/Ba**
Benjamin Electric Mfg. Co.	B 36
Claridge Products and Equipment, Inc.	B 37
Inland Steel Products Company	B 38
The Jecmen Company	B 39
Natural Slate Blackboard Co. and The Structural Slate Co.	B 40
Pennsylvania Slate Producers Guild, Inc.	B 41
E. W. A. Rowles Co.	B 42
United States Plywood Corporation	B 43
Herman G. Behr Co.	1210

7. Doors

Cornell Iron Works	B 44
The Kinnear Manufacturing Co.	B 45
Trussbilt Division of Siems Bros., Inc.	B 46, 47
North American Iron & Steel Co., Inc.	B 48
United States Plywood Corporation	B 49

8. Wardrobes

The Interior Steel Equipment Co.	B 50
A. R. Nelson Company, Inc.	B 51
Richards-Wilcox Mfg. Co.	B 52, 53
John T. Fairhurst Co., Inc.	B 30, 31

9. Builders Hardware

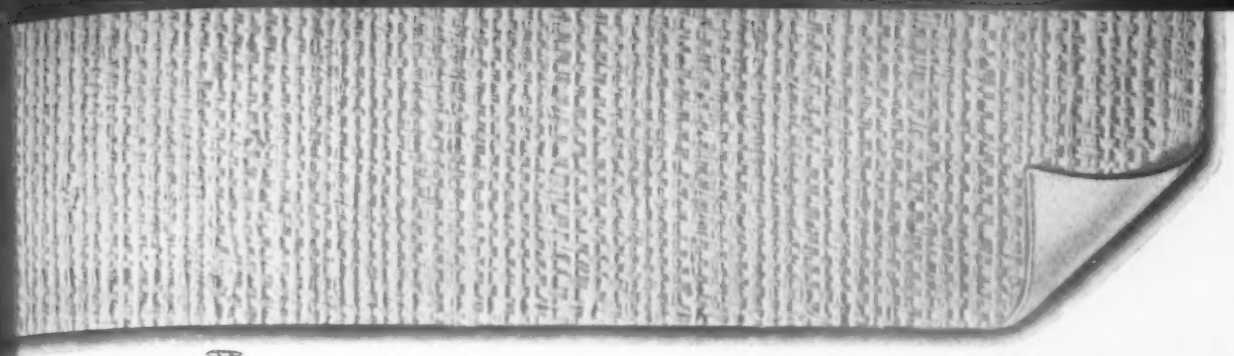
Glynn-Johnson Corporation	**B–9/Gl**
The Oscar C. Rixson Co.	**B–9/Ri**
Yale Lock & Hardware Division, Yale & Towne Mfg. Co.	**B–9/Ya**
Norton Door Closers	B 54
The Stanley Works, Hardware Division	B 55
Vonnegut Hardware Co., Von Duprin Division	B 56

10. Bronze Tablets

The Michaels Art Bronze Co., Inc.	B 57
Spencer Industries, Inc.	B 58
United States Bronze Sign Co., Inc.	B 59

Fund Raising Counsel

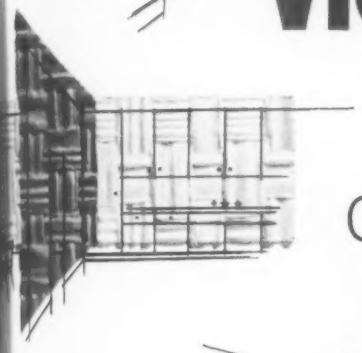
American City Bureau	B 11



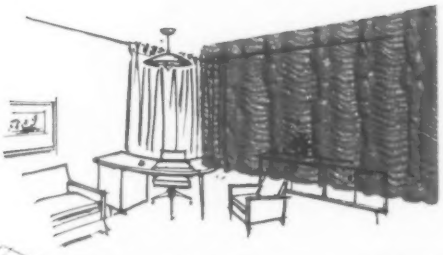
*vinyl electronically fused



VICRTEX V.E.F.* FABRICS



on WALLS OF FAME



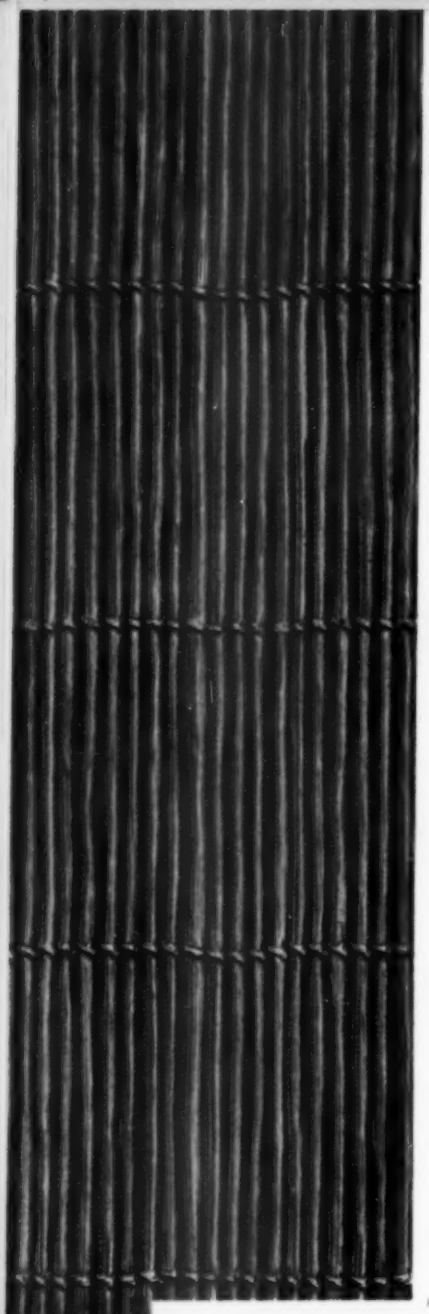
in homes, schools, hospitals,
hotels, restaurants, offices, stores,
banks, ships ... **everywhere...**

L. E. CARPENTER & COMPANY, INC. EMPIRE STATE BUILDING, NEW YORK 1, N. Y.



At the popular Coffee House in New York's **Hotel Roosevelt,** it's Madagaska, Bambu and Palmetto, for chairs, walls, columns, banquettes and counter fronts.

A.I.A. FILE NO. 28-C



handsome is as handsome does!

VICRTEX V.E.F.* FABRICS

*VINYL ELECTRONICALLY FUSED

The fame of VICRTEX V.E.F.* FABRICS is spreading . . . wall to wall. Texturally beautiful, they create an aura of luxury; practically indestructible, they'll cover these "Walls of Fame" indefinitely!

WHAT IS VICRTEX V.E.F.*?

The finest quality vinyl . . . molded by a special Carpenter process into the handsomest tri-dimensional patterns ever created . . . then sealed at high heat to a firm cotton backing. VICRTEX fadeproof colors . . . handsome pastels, clear middles, and impressive deep tones . . . go all the way through the deep vinyl surface. They can't be scratched, chipped or peeled away.

SEE FOR YOURSELF

Visit any of the handsome public installations of VICRTEX *at any time*. Time does not perceptibly age them, nor constant use abuse them, nor weather fade them. Every installation, whatever its date of origin, is the finest recommendation VICRTEX can have!

● **practically indestructible!**

CAN'T SNAG, CHIP, CRACK, PEEL OR SCRATCH



● **weatherproof—splashproof**

IMPERVIOUS TO SUN, SALT, DAMP, COLD, HEAT, WIND, RAIN



● **wipes clean with damp cloth!**

GREASE, GRIME, SOOTY SMOKE, FINGERMARKS, EVEN INK AND CRAYON WIPE RIGHT OFF!





● **supported vinyl fabric**

NEEDS NO OTHER LINING WHEREVER AND HOWEVER USED



● **versatile—soft—pliant**

CAN BE DRAPED, PLEATED, FOLDED, STITCHED—EASILY APPLIED TO ANY FLAT OR CURVED SURFACE —WALL OR FURNITURE!





● **see 20 deeply sculptured 3D textures . . . 36 fadeproof House & Garden colors**

..effect handsome economies on the job!





At **Rich's**, Atlanta, Vicrtex puts shoes in a selling setting; ...also seen in the ladies coat-and suit department.



Stylish Vicrtex helps **Arnold Constable** sell high-style in its chic Manhasset, L.I. store.

Fellows *will* rough-house. So Wallingford, Conn. **YMCA** covers the recreation room walls with Vicrtex . . . and says go to it.



Riker's Corner House on New York's art-conscious 57th Street commissioned murals for its Vicrtex walls.



miles and miles of **VICRTEX** V.E

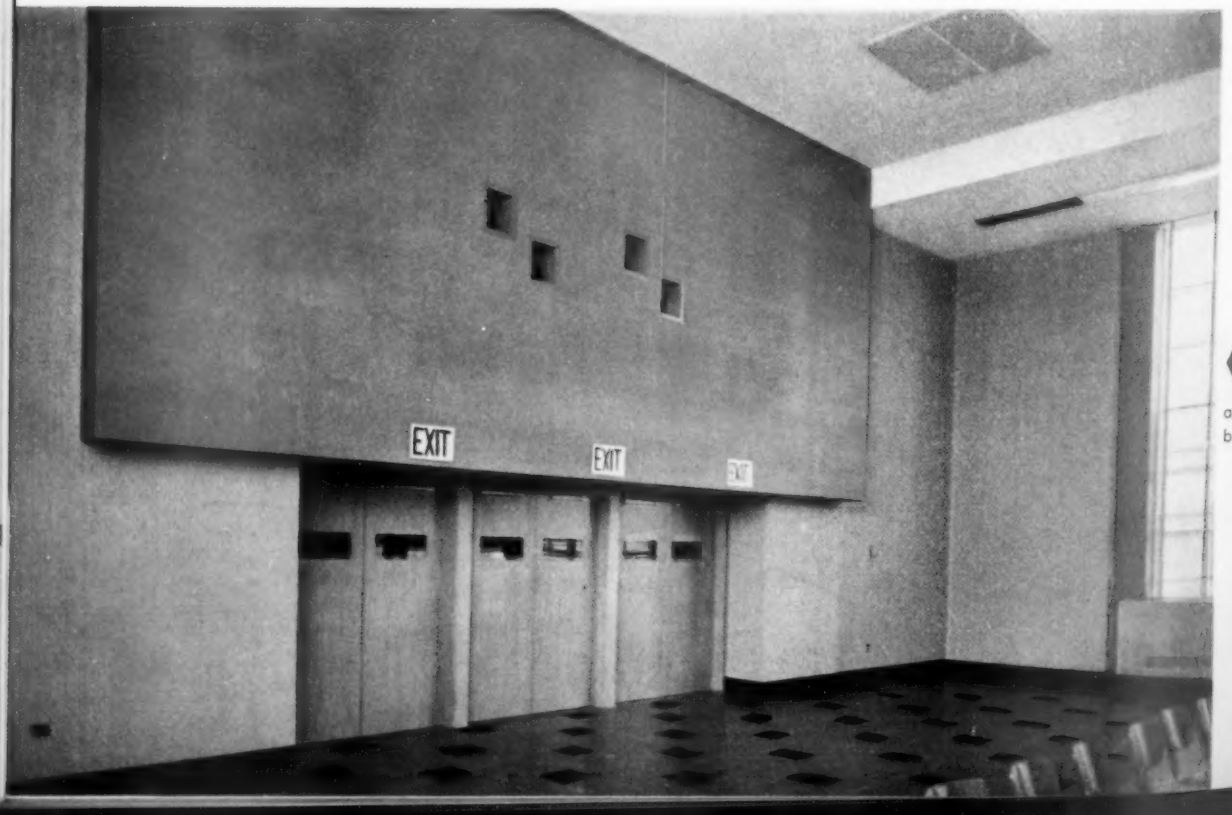


Corridors of **Michigan State College** take the Vicrtex way to honors in wear-free beauty.

At **Rutgers University,** Vicrtex Algeria on dadoes and other exposed wall areas lowers maintenance cost of higher education.

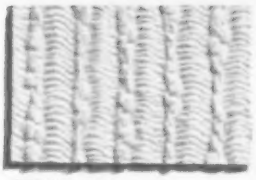


Like good books, Vicrtex *endures* . . . looks at ease in conference room of publishers **Doubleday & Company.**



Hillside Hospital uses Vicrtex Borneo and Madagaska in beautiful complement

L. E. CARPENTER &



CORONATION



PRINCESS



MADAGASKA

V.E WALLCOVERING

...ure high maintenance costs
...in HOSPITALS

...n private rooms, recreational lounges, wards ... in lobbies, ...uditoriums, corridors ... in offices, kitchens, laboratories ... ...erywhere ... Vicrtex makes attractive environment part of ...e cure. Let wheelchairs bump it, moving beds thump it. No ...arm done! And because Vicrtex banishes "time-out" for paint-...g, administrators keep *every* room "in service" at all times. ...ame for bedside chairs: no stains from medications, acids!

HOSPITAL	LOCATION
Beth-El Hospital	Brooklyn, N. Y.
Boulevard Hospital	Astoria, L. I.
Central Medical Group Bldg.	Brooklyn, N. Y.
Coney Island General Hospital	Coney Island, N. Y.
East Harlem Hospital	New York, N. Y.
Elmhurst Hospital	Elmhurst, L. I.
Hebrew Convalescent Home	New York, N. Y.
Henry Heywood Memorial	Gardner, Mass.
Hillside Hospital	Glen Oaks, L. I.
Hospital for Joint Diseases	New York, N. Y.
Ingleside Hospital	Cleveland, Ohio
Kings Highway Nursing Home & Hospital	Brooklyn, N. Y.
Massachusetts General	Boston, Mass.
Miriam Hospital	Providence, R. I.
Nassau Hospital	Mineola, N. Y.
Overlook Hospital	Summit, N. J.
St. Joseph's Hospital	Atlanta, Ga.
Toronto Western Hospital	Toronto, Ont.
U. S. Army Hospital	Wright Patterson AFB, Ohio
Upper Manhattan Medical Group Clinic	New York, N. Y.
Waterbury Hospital	Waterbury, Conn.

lower cost of higher education
... in SCHOOLS, COLLEGES

Vicrtex, the taxpayer's delight, serves generations of students! Use Vicrtex in the *expected* places ... in classrooms, cafeterias, corridors, kitchens, laboratories, auditoriums. Then take a cue from the visionaries who *also* put it to work on tackboards, sliding across blackboards, designed it into beautifully functional bulletin boards, wrapped it around much-abused columns, used it to conceal supply closets. Use Vicrtex out of school, too: you'll like its lasting disdain for weather's whims!

A few installations where Vicrtex has proved right ... visually, economically:

SCHOOL OR UNIVERSITY	LOCATION
Bedford School	Westport, Conn.
Cornell University	Ithaca, N. Y.
Drew University	Madison, N. J.
Fordham University	New York, N. Y.
Hollow Tree School	Darien, Conn.
Indiana University	Bloomington, Ind.
Junior High School	Darien, Conn.
Junior High School	Manhasset, L. I.
Michigan State College	East Lansing, Mich.
Millburn High School	Millburn, N. J.
North Carolina State	Durham, N. C.
Public Schools (3)	Mineola, L. I.
Public School No. 172	New York, N. Y.
Public School No. 263	New York, N. Y.
Regional High School	Woodbridge, Conn.
Ridgeway School	White Plains, N. Y.
Rutgers University	New Brunswick, N. J.
Syracuse University	Syracuse, N. Y.
Tufts College	Somerville, Mass.
University of Washington	Seattle, Wash.
West Side School	Cold Spring Harbor, L. I.

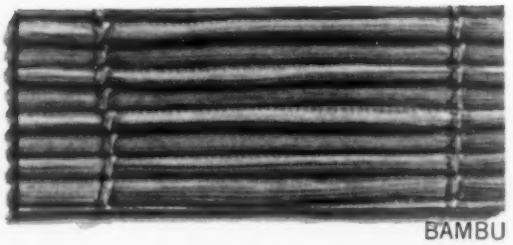


Vicrtex beauty keys into the salty atmosphere of **Holland-America's** showroom.

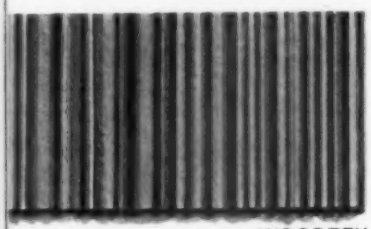
VICRTEX V.E.F.* FABRICS...

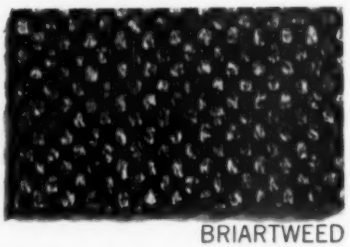
*VINYL ELECTRONICALLY FUSED


MADAGASKA


BAMBU

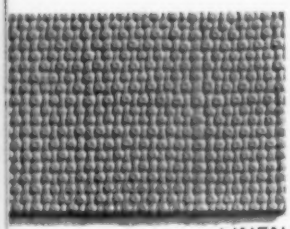

BOUCLE

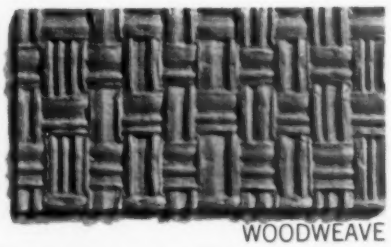

WOODTEX

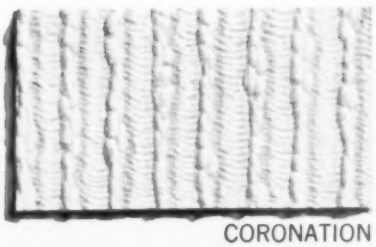

BRIARTWEED

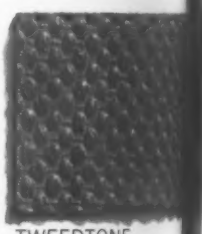

IRISH BASKET

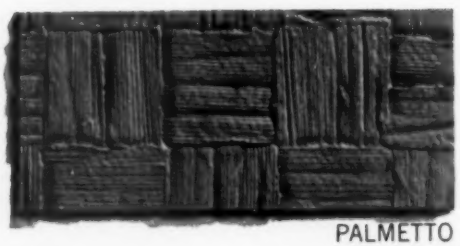

ALGERIA

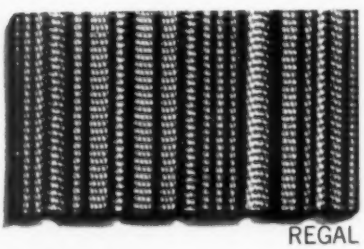

LINEN

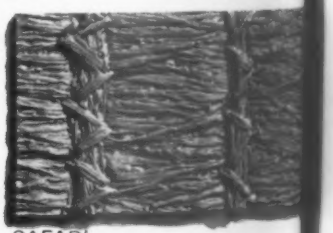

WOODWEAVE

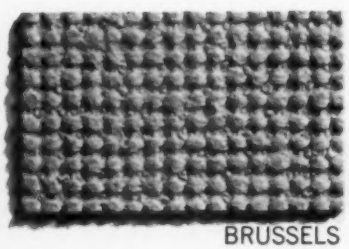

CORONATION


TWEEDTONE


PALMETTO


REGAL

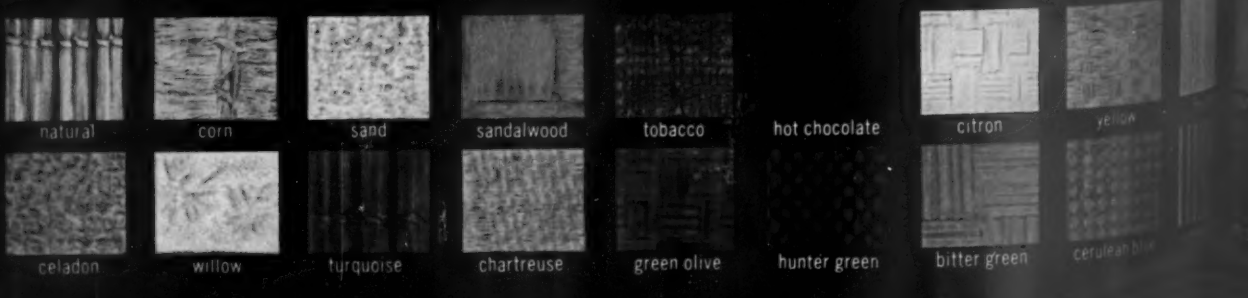

SAFARI


BRUSSELS


HANDLOOM


SAHARA


PRINCESS



12m
Ca

....best serve your TEXTURE INTEREST and COLOR NEEDS

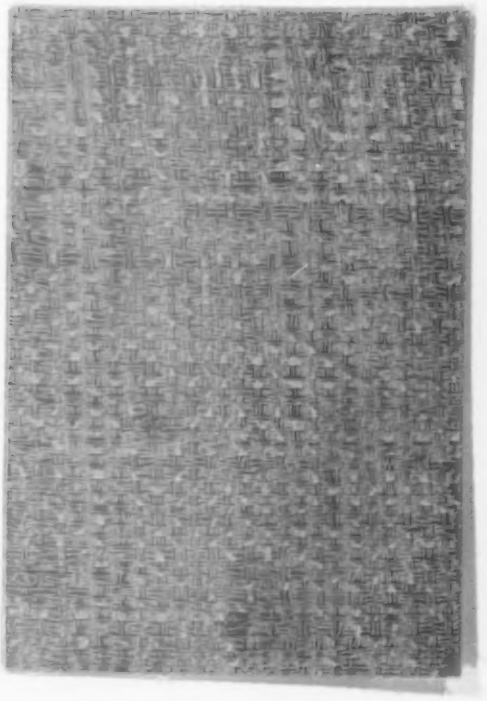
THE FASCINATING TEXTURES OF VICRTEX CATCH THE EYE . . .
but can't catch, snag, pull, or fray—ever!

Among the 20 smartly different textures and 36 House & Garden colors in which Vicrtex is offered, you are sure to find the ones that will create the impression you want . . . striking or restful . . . modern or traditional . . . stylish or businesslike. There's a Vicrtex for *every* type of decor. And L. E. Carpenter is constantly introducing new textures, in trend-setting as well as trend-following colors. Be sure you know the *whole* Vicrtex story. We'll be glad to send you specific swatches . . . or suggest textures and colors to match your planning.

THE ENCHANTING COLORS OF VICRTEX CAN'T BE SCRATCHED
because they go all the way through the deep vinyl surface!

Muted pastels, bright middles, handsome deep tones offer every conceivable possibility in chromatic and monochromatic decor. The texture interest adds to the color interest too. Light-and-shadow subtleties of tone are characteristic of deeply beautiful VICRTEX.

36 FADEPROOF HOUSE & GARDEN COLORS



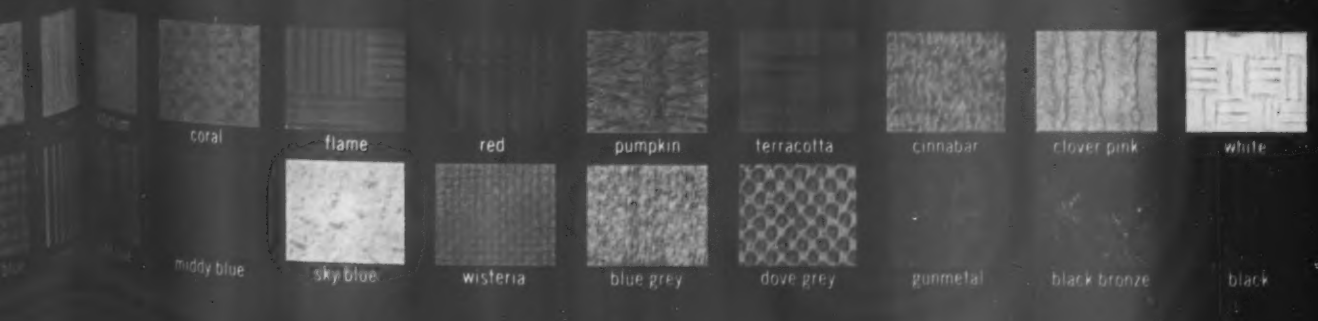
Here's a swatch of VICRTEX. Feel its interesting texture . . . lift it . . . examine this vinyl-supported fabric that needs no lining however used, that will never fade, fray or crack.

TEXTURES ARE AVAILABLE IN COLORS AND WEIGHTS INDICATED ON THIS CHART • **WRITE FOR SWATCHES AND PRICES**

	NATURAL	CORN	SAND	SANDALWOOD	TOBACCO	HOT CHOCOLATE	CITRON	YELLOW	MUSTARD	NASTURTIUM	CORAL	FLAME	RED	PUMPKIN	TERRACOTTA	CINNABAR	CLOVER PINK	WHITE	CELADON	WILLOW	TURQUOISE	CHARTREUSE	GREEN OLIVE	HUNTER GREEN	BITTER GREEN	CERULEAN BLUE	SUMMER BLUE	PACIFIC BLUE	MIDDY BLUE	SKY BLUE	WISTERIA	BLUE GREY	DOVE GREY	GUNMETAL	BLACK BRONZE	BLACK	LIGHTWEIGHT	HEAVYWEIGHT
MADAGASKA	*	*			*	*	*	*			*		*	*	*	*		*			*	*		*	*						*	*				*	*
BAMBU	*							*	*				*	*	*			*			*	*		*			*								*	*	*
BOUCLE			*	*		*	*					*		*	*	*		*	*	*			*	*	*	*		*					*				*	*
TWEEDTONE				*			*		*		*	*			*			*		*			*	*		*	*					*					*
ALGERIA				*			*		*	*		*			*			*		*		*	*		*	*			*			*					*
PALMETTO			*	*		*	*					*		*	*	*		*	*	*			*	*	*	*		*					*				*	*
WOODTEX			*	*		*						*			*	*		*					*					*					*				*	
BRIARTWEED	*				*				*		*				*	*		*					*	*					*							*	*	
WOODWEAVE	*		*	*		*	*					*		*	*	*		*	*	*			*	*	*			*					*				*	*
REGAL						*							*						*				*				*											*
IRISH BASKET	*						*					*				*		*	*						*												*	*
LINEN			*	*			*		*			*				*	*	*		*			*		*	*			*	*	*						*	
SAHARA			*	*			*		*			*				*	*	*		*			*		*	*			*	*	*						*	
PRINCESS							*									*		*		*			*			*			*	*	*				*			*
BRUSSELS				*			*		*			*				*		*					*	*	*	*		*					*				*	*
CORONATION	*		*	*			*		*			*					*	*	*				*		*								*				*	*
HANDLOOM	*		*				*		*			*				*	*	*		*				*		*			*	*				*				*	
SAFARI	*	*			*		*		*			*		*		*	*	*		*			*	*		*				*					*			*	

Any special color available in any pattern on orders of 300 yds. or more.

L. E. CARPENTER & COMPANY, INC. • EMPIRE STATE BUILDING, NEW YORK 1



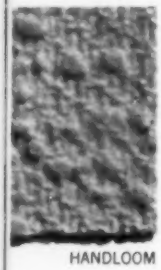


WOODTEX



PALMETTO

VICRTEX V.E.F. FABRICS



HANDLOOM

for the welcome that never wears out
... in HOTELS, RESTAURANTS, SHIPS

Start by putting Vicrtex where you'd *expect* the heaviest upkeep costs. *Dadoes?* Vicrtex cuts their maintenance demands to practically nil—*for years without end.* But Vicrtex is so budget-wise, you'll use it floor-to-ceiling ... and on ceilings too! In guest rooms ... dining rooms ... halls ... lobbies ... "special-events" rooms ... *of course.* But use it in unseen-to-the-public areas, too, where its beauty is a dividend, its easy upkeep a capital gain!

Vicrtex keeps the best of company. Look:

HOTEL, RESTAURANT, CLUB, SHIP	LOCATION
Algiers	Miami, Fla.
Ambassador Hotel	Los Angeles, Calif.
Biltmore Hotel	New York, N. Y.
Carleton House	Pittsburgh, Pa.
Conrad Hilton	Chicago, Ill.
Flamingo Hotel	Las Vegas, Nev.
Hillcrest Hotel	Toledo, Ohio
Hollywood Beach Hotel	Hollywood, Calif.
Lord Baltimore Hotel	Baltimore, Md.
Madison Hotel	Minneapolis, Minn.
Mark Hopkins Hotel	San Francisco, Calif.
Mayan Restaurant	New York, N. Y.
Moore-McCormack Lines, Inc.	S. S. Argentina, Uruguay, Brazil
New Yorker Hotel	New York, N. Y.
North Hills Country Club	Douglaston, L. I.
William Penn	Pittsburgh, Pa.
Roosevelt Hotel	New York, N. Y.
St. Moritz Hotel	New York, N. Y.
Sands in the Sahara	Las Vegas, Nev.
Saxony Hotel	Miami, Fla.
Hotel Statler Chain	New York, N. Y.
Surf and Sand Club	Hyannis, Mass.
Taft Hotel	New York, N. Y.
United States Lines	S. S. United States
Whitehall Hotel	West Palm Beach, Fla.
White Turkey	New York, N. Y.
Willard Hotel	Washington, D. C.

Business-like beauty!
... in STORES, OFFICES, APARTMENT HOUSES

In conference rooms, executive offices, showrooms, foyers, fitting rooms ... *in selling areas* ... Vicrtex is your silent salesman. And it will go on selling for years on end. Use it where traffic is heaviest. Vicrtex invites *more* traffic! That's why you'll find Vicrtex among these national leaders:

STORE, OFFICE, BANK, APARTMENT HOUSE	LOCATION
American Broadcasting Co.	New York, N. Y.
America Fore Insurance	New York, N. Y.
Burdine's Chain	Miami, Fla.
Carnation Milk Co.	Los Angeles, Calif.
295 Central Park West	New York, N. Y.
Arnold Constable	Manhasset, L. I.
Continental Can Building	New York, N. Y.
Doubleday & Co., Inc.	New York, N. Y.
Filene's	Boston, Mass.
General Foods	Westchester County, N. Y.
Higbee Apartments	Cleveland, Ohio
Hudson's	Detroit, Mich.
Irving Trust Co.	New York, N. Y.
Jordan-Marsh	Framingham, Mass.
F. R. Lazarus	Columbus, Ohio
Lever House	New York, N. Y.
Lord & Taylor	West Hartford, Conn.
Lord & Taylor	Manhasset, L. I.
Lord & Taylor	Philadelphia, Pa.
Majestic Apartments	New York, N. Y.
Manufacturers Trust	New York, N. Y.
National City Bank of New York	New York, N. Y.
Prudential Life Insurance Co.	Dallas, Texas
Reinhold Publishing Co.	New York, N. Y.
Saks Fifth Avenue	White Plains, N. Y.
Travelers Indemnity Co.	Hartford, Conn.
Toronto Stock Exchange	Toronto, Ont.
Uris Brothers	New York, N. Y.
John Wanamaker Chain	Philadelphia, Pa.
Western Electric	New York, N. Y.
Woodward & Lothrop	Washington, D. C.



What part of a hote
room is hardest hit
Where does New York's
Hotel Commodore put
Vicrtex? Dadoes!

L. E. CARPENTER & CO.

keep **up** with handsome decorative trends . . . keep upkeep **down!**





Port of New York Authority gives protective beauty of Vicrtex to chairs, banquettes, and walls in the busy **"Newarker," airport bar.**



Chicago's **Conrad Hilton** finds Vicrtex elegantly functional for chairs, partitions, and folding doors in its beautiful Park Row Restaurant.

New Orleans smart **Hotel Pontchartrain** puts Madagaska on chairs and benches, Bambu in its corridors.



Putsch's Cafeteria in Kansas City features Bambu, Madagaska and Vicrtex on chairs, banquettes and 75' serpentine couch.



the future is as bright as the day you install VICRTEX



Sunproof Vicrtex shines in this **Norwalk, Conn.** sun parlor—Bambu chair, Boucle walls, Regal Extendoor.

Scuffproof Vicrtex makes a care-free **Long Island** rumpus room—Palmetto walls, Boucle sectionals.

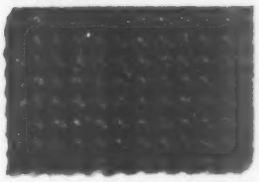


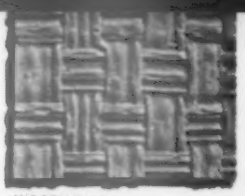
Splashproof Vicrtex "Woodweave" goes floor to ceiling in **House & Garden's** "Bath for a Bachelor."



Magnificent offices of **Meinhard & Company** in New York, decorated by Intramural, Inc., with white and bright mustard yellow walls and columns.

L. E. CARPENTER & CO.


BRUSSELS


WOODWEAVE


SAFARI

VICRTEX V.E.F. FABRICS

are the "NEW IDEA" ... from "dream homes" to House & Garden's "House of Ideas"



HOUSE & GARDEN features sun and rain resistance of Vicrtex on terrace furniture of its **West Hartford, Conn.** "House of Ideas."

Editorially ... socially ... VICRTEX is seen in the right places. Splashproof VICRTEX sets the decorative trend ... from "Dream" Bathrooms to Terraces, from Cocktail Lounges to Chemical Laboratories.

Flame-Stain-Soil-Resistant VICRTEX is the perfect wall and utility covering ... from Restaurants to "Dream" Kitchens. Any soil that does manage to get on it—grease, grime, sooty smoke, fingermarks, even *ink*—wipes right off with a damp cloth! Once it's up, VICRTEX keeps *upkeep* DOWN—*never needs painting or re-decorating!*

Look at the record. The illustrations speak for themselves ... and for VICRTEX.



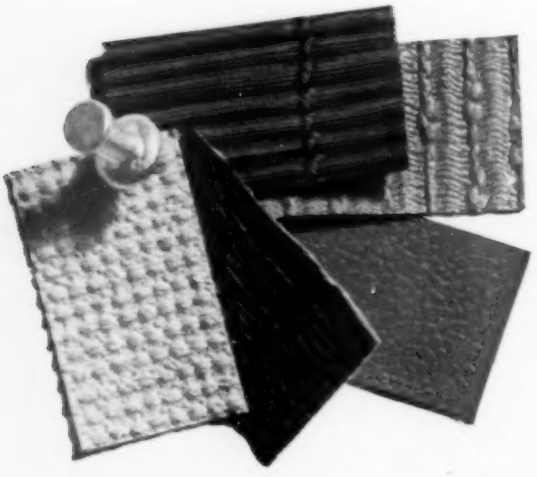
Grease-resistant Vicrtex goes all over this suburban **Boston** kitchen. Walls and ceilings.

WHO SPECIFIES VICRTEX?

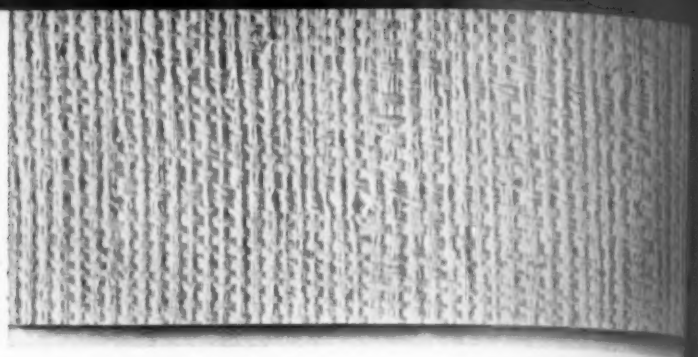
ARCHITECTS ALL ACROSS THE LAND!

The list is a long one, and growing daily. Here are just a few of the many architects and designers who have found in Vicrtex the beautiful answer to their clients needs.

Louis Allen Abramson, New York, N. Y.
Walter M. Ballard Corp., New York, N. Y.
Iolabee Berson, Brooklyn, N. Y.
Robert O. Burton, Chicago, Ill.
J. Gordon Carr, New York, N. Y.
Carson & Lundin, New York, N. Y.
Copeland-Novack Association, New York, N. Y.
Dawson, Oliver & Murtagh, New York, N. Y.
Henry End, Kansas City, Mo.
Fletcher-Thompson, Inc., Bridgeport, Conn.
A. W. Geller, New York, N. Y.
Gross & Sons, New York, N. Y.
Victor D. Gruen, Hollywood, Calif.
Harding & Driscoll, Westport, Conn.
Alfred Hopkins Association, New York, N. Y.
Seymour R. Joseph, William C. Vladick, New York, N. Y.
Ketchum, Gina & Sharp, New York, N. Y.
Morris Lapidus, New York, N. Y.
Lippincott & Margulies, New York, N. Y.
Raymond Loewy Associates, New York, N. Y.
Charles B. Meyers Assoc., New York, N. Y.
New York Architects Assoc., New York, N. Y.
O'Connor & Kilham, New York, N. Y.
G. B. Post & Son, New York, N. Y.
Frazier and Raftery, Geneva, Ill.
Kenneth H. Ripnen, New York, N. Y.
Emery Roth & Sons, New York, N. Y.
John D. Rybakoff, Inc., New York, N. Y.
Schoen & Hennessy, New York, N. Y.
Shreve, Lamb & Harmon Assoc., New York, N. Y.
York & Sawyer, New York, N. Y.
Voorhees, Walker, Foley & Smith, New York, N. Y.



WRITE FOR SWATCHES AND PRICES:



SUGGESTED SPECIFICATIONS for VICRTEX V.E.F.* WALLCOVER

SCOPE OF WORK—this contractor shall furnish all material, equipment a services necessary to install the vinyl wallcovering material, where called fo the room finishes schedules on the drawings.

MATERIAL—the vinyl wallcovering shall be "Vicrtex V.E.F."* as manufactu by the L. E. Carpenter & Co., Inc., Empire State Building, New York 1, N The material shall be composed of a woven cotton fabric of suitable weight shall have a compound of vinyl resin, pigment and a plasticizer electroni fused to one side of the fabric. The "Vicrtex V.E.F."* shall be handled and plied in strict accordance with the manufacturer's printed instructions. Co and textures shall be as selected by the Architect.

WORK NOT INCLUDED—all repair, patching, etc., of walls and partition excluded from this contract.

ADHESIVE—Carpenter's F1460W Adhesive is recommended to install Vic vinyl coated fabrics to walls and ceilings in general areas. It bonds to dry, cl plaster, wood, most paints and to dimensionally stable composition board rigidly fastened.

PREPARATION—Do not thin F1460W adhesive. All surfaces must be clean, d smooth and structurally sound. Usual wall preparation is all that's necessa except on asbestos board and other highly alkaline surfaces such as cement bl and portland cement plaster. Use chlorinated rubber base paint to prime th surfaces. Adhesive should be at normal room temperature to assure brushi consistency. Clean excess adhesive from material and tools with clean wa water.

Carpenter's Waterproof adhesive is recommended to install Vicrtex in areas where there might be a moisture condition, such as bathrooms and kit ens. It bonds to dry, clean plaster, masonry, wood, metal, glass, ceramics and most firm fibered, dimensionally stable composition boards if rigidly fasten Priming is unnecessary except on asbestos board and other highly alkaline su faces such as cement block and portland cement plaster. Prime these surfa with chlorinated rubber base paint. Adhesive should be at normal room tempe ture to assure brushing consistency. Clean excess adhesive from material a tools with petroleum naphtha. Do not use carbon tetrachloride or lacquer solv

Listed below is a copy of "Hanging Instructions" included in each roll Vicrtex Wall Fabric.

IMPORTANT! If This Material is Used For Wall Installation Please Follow These Instructions:

HANGING INSTRUCTIONS—When hanging VICRTEX patterns reve every other strip and cut in selvage deep enough when necessary to ensure ex uniformity.

Some patterns, due to their design, have a repeat mark approximately ev 19" (nineteen inches). Be sure these marks line up to get the most satisfacto finished results.

Materials can be installed using regular paper hanging methods. Howev due to the weight of these materials, when securing them to the wall a brus knife can be better used instead of a brush to smooth fabric to the wall surfa and eliminate air bubbles.

Fabrics can be:

1. Cut using straight edge and seams butted.
2. Lapped an inch or so to the previous piece on wall and seam cutter us

The first method seems more satisfactory as it eliminates excess adhesive seams, cutting down cleaning operation.

Use Carpenter's F1460W adhevise for general areas. Use Carpenter's Wate proof adhesive where moisture conditions may be present, such as bathroo and kitchen areas. VICRTEX fabrics do not breathe like wallpaper or canvas an therefore, usual adhesives are not satisfactory. *Do not use starch or wheat pa*

Manufacturer will not be responsible for any material if not installed wi recommended adhesive.

* vinyl electronically fu

L. E. CARPENTER & COMPANY, INC.

Sales Office: Empire State Building, New York 1 • LOngacre 4-0080 • Mills: Wharton, New Jersey

VICRTEX V.E.F.* FABRICS

PLUS

EXTENDOOR'S X



EXTENDOORS provide new decorative value in folding doors with controlled, uniform draping. Furnished for both manual and mechanical operation in standard or custom-made sizes. Fabrics are Vicrtex —in more than 20 patterns and 36 colors. For catalog, write to EXTENDOOR, Inc., Muskegon, Michigan.

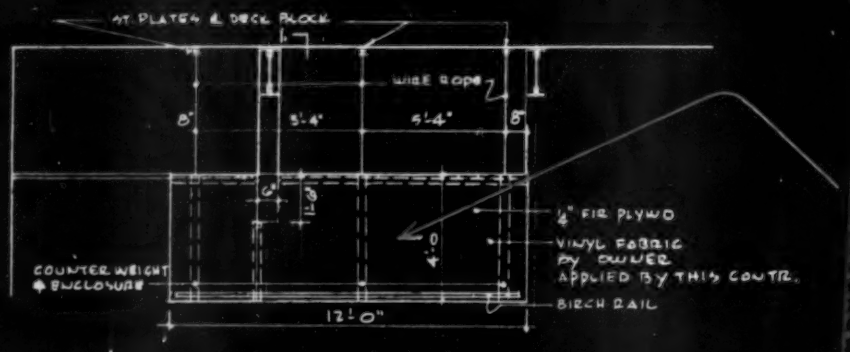
. . . FORMULA FOR A BEAUTIFUL SOLUTION TO YOUR PROBLEMS IN DIVISION

"X" — Extendoor's unique and exclusive "Extendible X" — is a double pantagraph-action mechanism which joins the twin row of full-length, sound-deadening Extendoor frame panels and insures smooth, uniform operation at both top *and* bottom! Extendoors glide quietly open and closed with only a fingertip touch *at any point.* Whether you're saving space or dividing it, Extendoor's "X" provides privacy and "V.E.F." provides enduring beauty and ease of maintenance as well. Vicrtex V.E.F.* Fabrics are an integral part of mobile, flexible Extendoors . . . conform with graceful ease to every fluid contour. Virtually indestructible, these vinyl fused fabrics can't scratch, chip, scuff, peel or fade — and they wipe clean with a damp cloth. The more than 20 three-dimensional V.E.F.* patterns, in 36 House & Garden colors, add deep-textured charm and enduring loveliness to *everything* they cover — Extendoors or walls, furniture or accessories. Why not write for samples today?

VINYL SUPPORTED FABRIC . . . needs no backing, however used.

*vinyl electronically fused

L. E. CARPENTER & COMPANY, INC.
SALES OFFICE: Empire State Building, New York 1 • Longacre 4-0080
MILLS: Wharton, New Jersey









here's how

VICRTEX V.E.F.* FABRICS

help Ketchum, Giná & Sharp multiply wall space at Hollow Tree School

Faced with the necessity of having a room serve many purposes, architects Ketchum, Gina & Sharp specified Vicrtex to cover the ingenious panels they designed to multiply wall space at the Hollow Tree School. Vicrtex MADAGASKA on the "black out panels" that hide the youngsters' coats and serve as display tack boards, resists the marks of eager fingers, doesn't even show thumbtack marks! It wipes clean when a new display is in order. Vicrtex V.E.F.* Fabrics are schooled to a multiplicity of uses because they won't fray, chip, peel, or scratch; are stain, flame and soil resistant; practically indestructible. In 36 fadeproof House & Garden colors, over 20 three-dimensional patterns, only Vicrtex gives the correct answer to such a multitude of decorating problems.

WRITE FOR: Carpenter's new Brochure #117-b, "How to Cut Your Decorating and Maintenance Costs." Actual Vicrtex V.E.F.* treatments and swatches included.

HANDLOOM



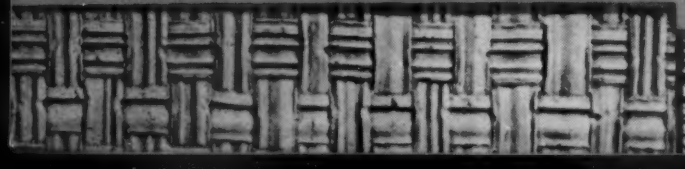
L. E. CARPENTER & COMPANY INC.

SALES OFFICE: Empire State Building, New York 1 • LOngacre 4-0080 • MILLS: Wharton, New Jersey

* vinyl electronically fused

See our Catalog in SWEET'S 12m/Ca
A. I. A. File #28-C

WOODWEAVE



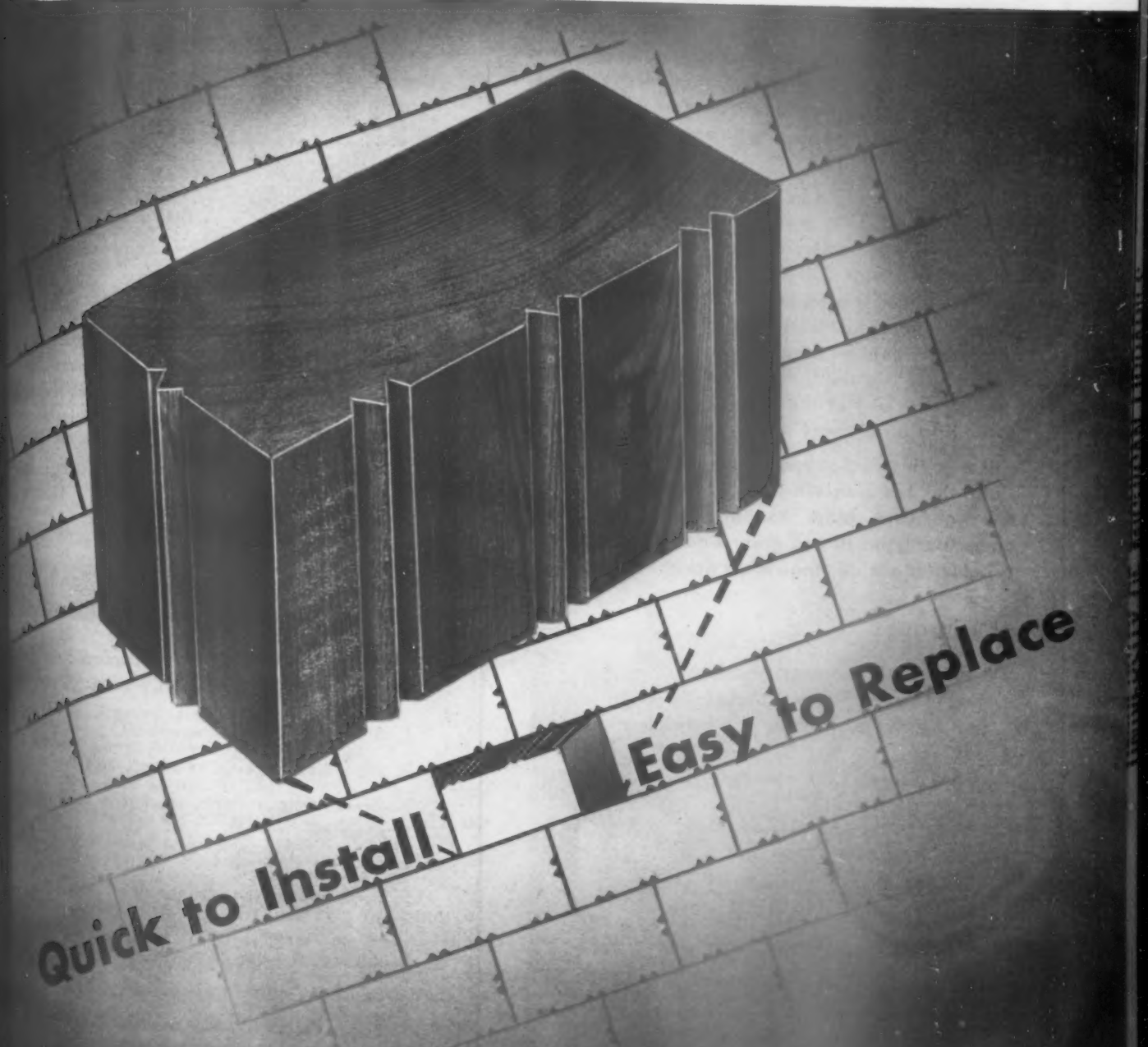
SAFARI



THE

B-1/Je

KREOLITE WOOD BLOCK FLOORS



Quick to Install

Easy to Replace

THE JENNISON-WRIGHT CORPORATION • TOLEDO 1, OHIO

KREOLITE WOOD BLOCK FLOORS

Kreolite wood block flooring, smooth, durable, for both heavy and light duty industrial use, is designed to meet the requirements of all types of production facilities.

The basic theory of wood block flooring is the "chopping block." The ancients used the end grain of logs to absorb and withstand the heavy blows of hammer and knife, until end grain wood became a byword for toughness. The ability of end grain wood to resist splintering, combined with the fact that heavy blows and abrasion merely mat down the surface fibers, are factors substantiating this reputation.

End grain wood blocks were first used in street paving. The blocks were usually from 3½ to 4 inches in depth, and were noted for their durability under heavy traffic. It was found that, protected from weather, this same quality prevailed when used for industrial flooring and that the depth of the blocks could be materially reduced without reducing the durability. This reduction in depth brought the cost of the flooring down sufficiently to be in a price range appealing to all industries.

Utilizing this factor and advanced technological data, the Jennison-Wright Corporation, manufacturer of wood block flooring since 1911, now offers four types of end grain wood block flooring suitable for a wide range of service.

advantages

- **quick installation, immediate use**
- **flow maintenance cost, economical repair**
- **low tractive resistance, comfortable under foot**
- **dustless**
- **noise and vibration absorbent**
- **resilient**
- **insulation against heat and cold**
- **spark-proof and skid-proof**
- **firm foundation for machinery**
- **durable, withstands heavy abuse**

building types

Kreolite Kountersunk Lug—for heavy or light industrial service, inside or out.

Kreolite Bevelug—for general industrial use.

Kreolite Grooved—for heavy or light interior industrial use.

Kreolite Flexible Strip—for printing plants, schools, drill halls, gymnasia, etc.

KREOLITE Jennite

Kreolite Jennite, a water-and-oil resistant bitumi filler, is used exclusively on Kreolite creosoted w block flooring. It is recommended for use as a f filler and finish for all Kreolite Class I and Class II w block flooring construction. It is also recommended use in the rejuvenation of old wood block floors, proving their service and appearance as well as p longing their life.

A cool tar pitch emulsion, consisting of an irre sible colloid composed of a heavy closed ring hyd carbon base dispersed in water, Kreolite Jennite h none of the objectionable characteristics of ordi filler. It does not become soft and tacky under h temperatures.

Kreolite Jennite is applied with a hand squeeg without heating, after the initial sealing with Kreo hot pitch. This leaves a finish which is smooth, but slippery, providing good traction to truck tires and firm, safe foothold to workmen. It is oil resistant a does not soften in temperatures up to 275°F. Lo materials, such as paper and bits of string, will stick to its surface.

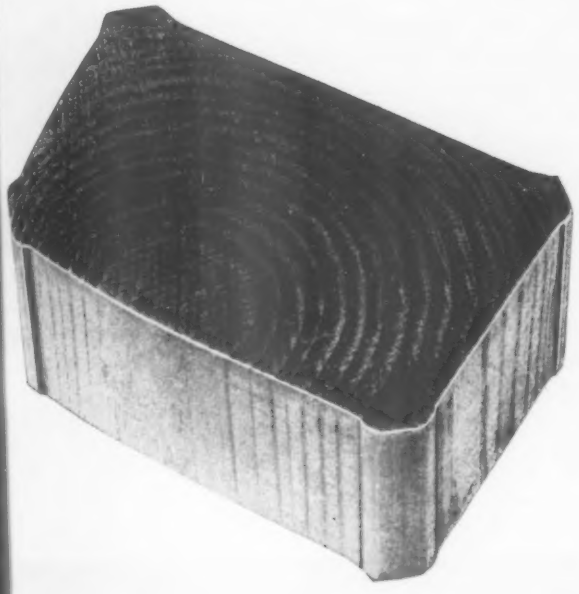
KREOLITE Seal-(W)right

Kreolite Seal-(W)right when applied over Kreo Jennite or Kreolite Pitch Filled Wood Block Floors:

1. Stops bleeding of creosote oil.
2. Eliminates tracking of oil into adjoining areas.
3. Gives lustrous finish which can be waxed or polished.
4. Reduces cleaning costs.
5. Seals against penetration of oil and cutting co pounds.
6. Reduces the use of oil drying compounds.
7. Reduces fire hazards caused by oily surfaces.
8. Bonds blocks together as well as sealing joints.
9. Reduces danger of buckling caused by flooding absorption of moisture.
10. Will make old floors look new.
11. Permits use of color paint for aisle-marking.
12. Improves morale of employees by better hou keeping.

KREOLITE Bevelug type

Patent Pending





Famous Kreolite innovations and improvements in creosoted wood block industrial flooring have been—successively:

1. **Kreolite Lug Blocks**
2. **Kreolite Grooved Blocks**
3. **Kreolite Kountersunk Lug Blocks**
4. **Kreolite Bevel Corner Blocks**
5. **Kreolite Bevelug Blocks** This latest design combines the advantages of all four of the above types.

Kreolite Bevelug Blocks: Note they are designed to provide for the use of a seal coat for top, bottom and four sides of *each unit;* thus by a thorough seal, offering best possible protection against loss and absorption of moisture, reducing to a minimum both shrinkage and expansion.

They are treated with Kreolite creosote oil injected under pressure.

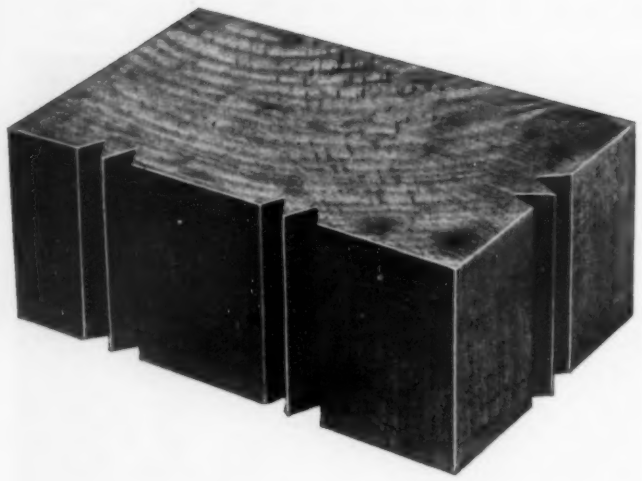


Over 234,000 sq. ft. of Kreolite Bevelug wood block floor recently installed in the latest addition to the Brookfield, Ill., plant of the Reynolds Metals Co.

architect—Vern E. Alden Co., Chicago, Ill.

general contractor—Engineering Construction Corp., Chicago, Ill.

KREOLITE Kountersunk lug type

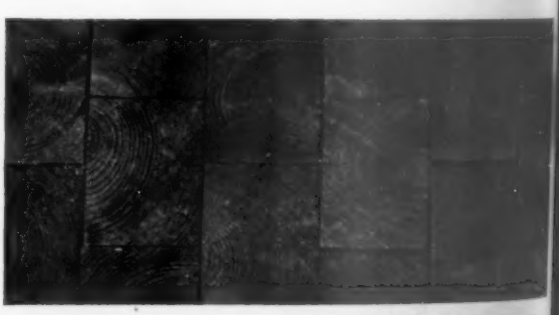


Kreolite Kountersunk lug type wood blocks are designed for all general industrial conditions: light or heavy; wet, damp or dry; interior or exterior service.

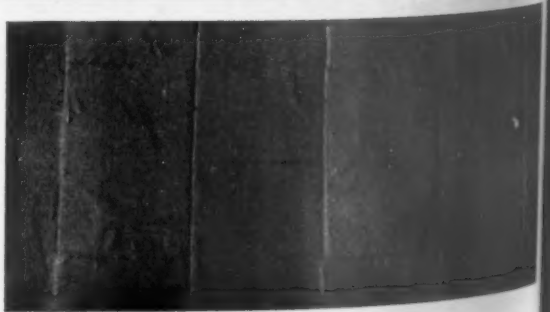
Kreolite Kountersunk lug type wood blocks are manufactured in depths of 2, 2½ and 3 inches of Yellow Pine and Upland Oak. For ordinary machine shop and light traffic operations, a 2-inch depth is satisfactory. A 2½-inch depth block is generally used where traffic is particularly heavy or where heavy weights or castings are dropped on the floor. Blocks 3 inches in depth and over are recommended for loading platforms and uncovered areas.

Kreolite Kountersunk lug type block has open joints to permit free penetration of the filler and binder around all four sides of each block. The block is impregnated with Kreolite creosote oil for protection against decay, moisture, vermin and termites.

application







section "A"

Kreolite Kountersunk lug wood blocks laid in the floor before filler is applied. The blocks may be driven up tightly together, as the lugs will provide a space for the thorough penetration of the essential bituminous binder and filler.

section "B"

Kreolite Kountersunk lug wood blocks after one application of hot Kreolite Pitch filler. For utmost efficiency, the bituminous filler should penetrate all around the sides and ends of each individual block. Because the blocks are laid directly upon a coating of bitumen, all sides of each block are sealed, imparting to the individual blocks greater resistance to moisture changes.

section "C"

Kreolite Kountersunk lug wood blocks, after one application of hot pitch filler, with a second application of Kreolite Jennite filler flushed over the surface, without heating, with the surplus removed with a rubber edged hand squeegee. At completion, joints should be filled uniformly to within approximately ¼ inch of surface.

KREOLITE grooved type

B-1/Je



Recommended for general industrial service, either heavy or light, the Kreolite grooved type wood block is suitable for use under dry interior conditions.

Kreolite Grooved type blocks are manufactured from air seasoned 3 x 6, 3 x 8, 4 x 6 or 4 x 8 end grain lumber, of Yellow Pine and Upland Oak. They are available in depths of 2, 2½, and 3 inches, depth varying with the intensity of traffic.

Kreolite Grooved type blocks are impregnated under pressure with Kreolite creosote oil for protection against decay, moisture, vermin and termites.

KREOLITE flexible strip type

natural color—end grain



Designed to meet the demand for a light, natural color end grain wood block floor for industrial service, printing plants, drill halls, gymnasia, etc., Kreolite flexible strip end grain wood block floor is a continuous strip type flooring.

Kreolite flexible strip blocks are held together by a galvanized steel wire truss embedded in the side surfaces of the strip. This prevents blocks from loosening, eliminates cupping, and provides a smooth nailless surface.

Kreolite strip block flooring is manufactured in depths of 2, 2½ and 3 inches; most commonly used in the 2-inch depth. The blocks are impregnated with a water-repellent preservative containing sufficient phenol solutions to act as a termite repellent and toxic against fungus attacks.

specifications

KREOLITE Kountersunk lug block
KREOLITE Bevelug block
KREOLITE grooved block

note: These specifications have been prepared so as to provide the architect with an option to select any of the above three block types.

manufacture

(architect: indicate choice of items 1, 2 or 3)

1. Kreolite Bevelug Blocks shall have beveled corners combined with lugs projecting approximately 1/16" from the face of all sides. These lugs shall be an integral part of the block and shall act as spacers.

2. Kreolite Kountersunk Lug Blocks shall have two or three lugs on one side and one lug on one end of each block. The lugs shall protrude approximately 1/16" from one side and 1/32" from one end of each block. The lugs shall be an integral part of the wood, extending in the direction of the grain. For wet conditions the lugs shall protrude approximately 1/8" from both the side and the end.

3. Kreolite Grooved Blocks shall have two or three grooves in one side of each block and one groove in one end.

All blocks shall be 2", 2½", 3" or 4" in depth, approximately 2¾ to 4 inches in width, and may vary from 3½ to 8½ inches in length. A variation of 1/16" shall be allowable in depth and 1/8" in width of blocks furnished.

They shall be manufactured from sound, air dried Southern Yellow Pine or Upland Oak and treated with Kreolite Creosote Oil, in accordance with the modern Kreolite Pressure Process, leaving at least 6 lbs. of oil per cubic foot of timber in blocks.

Season checks shall not be considered defects.

They shall be manufactured by The Jennison-Wright Corporation and laid according to the following specifications, under the direction of the manufacturer's superintendent.

installation

The blocks shall be installed on a thoroughly seasoned concrete base, which has been finished smooth and level (a smooth wood float finish will be satisfactory exactly the depth below the finished floor level corresponding with the depth of the block used. Care must be taken to see that there are no projections, ridges or waves in the concrete that will form an uneven bearing for the blocks.

The concrete base shall be thoroughly cleaned of dust and dirt and given a prime coat of Kreolite Priming Oil. After the Priming Oil has dried, it shall be given a thin, even coating of hot Kreolite Pitch, not exceeding 1/8" in thickness. This coating shall be allowed to harden before laying the blocks.

Upon the base, as above prepared, the blocks shall be laid tightly together with the grain vertical. The courses of the blocks shall be kept straight and parallel and all joints shall be broken by a lap of at least one inch. The blocks shall be laid with their length at right angles with the line of traffic.

expansion joints

Against the walls on all sides of the floor, as well as around all columns and other obstructions, a Kreolite Bituminous Expansion Joint one inch in width shall be used.

filler

a. Kreolite Bevelug or Kountersunk lug type After the blocks have been laid in place and brought to a true and level surface, the surface shall be flushed over carefully with Kreolite Pitch Filler, applied just below the boiling point, with a carefully manipulated squeegee machine. Care must be taken to leave a clean surface.

After a period of at least two hours, to allow the Kreolite Pitch Filler to cool and settle, an application of filler, consisting of Kreolite Jennite, shall be flushed over the surface, without heating, and the surplus removed from the surface at time of application with a rubber edged hand squeegee. A period of at least eight hours shall be allowed for the Kreolite Jennite to dry, after which the floor is ready for use. At completion, joints shall be filled uniformly to within approximately ¼" of surface.

b. Kreolite Grooved The sub floor shall be coated with a uniform coating of coal tar pitch having a melting point between 140°F and 155°F. Coal tar pitch shall be applied at the rate of approximately 6 lbs. per square yard and not to exceed 1/8" thickness. This coating shall harden before blocks are laid upon it. Kreolite Jennite finish optional with this type block.

note We do not recommend transverse expansion joints in the concrete base. If such joints are used they must be left far enough below the surface of the concrete, so that when expansion of the concrete occurs, the expansion joint material will not be forced above the surface and raise the blocks above the finished floor level.

All bidders shall base their price on wood blocks, priming oil, bituminous cement, pitch filler and Kreolite Jennite Filler as manufactured by The Jennison-Wright Corporation, to be laid in accordance with the best practices as recommended by them. Should the contractor, after securing the contract, desire to substitute material of another manufacture, he shall first submit samples, secure permission in writing to such substitution from the engineer, and shall state the amount to be deducted from or added to his contract price for such substitution.



Over 290,000 sq ft of Kreolite Kountersunk lug block flooring in the Curtis Publishing Co. plant at Sharon Hill, Pa. Over ½ million sq ft of Kreolite wood blocks in Curtis Publishing plants throughout the country.

engineer and contractor—Stone & Webster Engineering Corp., Boston, Mass.



Deadly Patton-48 medium tanks come off the assembly line at Ford Motor Co.'s Tank Division, Livonia, Mich., where over 1,128,000 sq ft of Kreolite Kountersunk lug blocks have been laid.

KREOLITE natural color flexible strip wood block

manufacture

Kreolite End Grain Flexible Strip Wood Block Flooring shall be kiln dried Southern Yellow Pine, not over 2" x 4" in cross section, and assembled in flexible strips two feet to eight feet in length, ... inches in depth parallel to the grain of the wood and approximately 3½" in width.

Flexibility permits the strips to readily conform to the contour and deflections of the subbase. After manufacture, assembled strips shall be flexible enough to conform to the arc of a 17-foot diameter circle without injury to blocks, or bonding trusses, without permanent deformation. Strips shall show end grain only, on both the top and bottom surfaces.

Individual blocks shall be bonded into strips by galvanized steel wire trusses tightly embedded within their side surfaces at right angle to the grain, and milled for tight fitting, galvanized crimped steel wire splines. Assembled strips shall be dressed square and true, to accurate, uniform dimensions on the wearing surface and two sides and shall be impregnated at the plant with Kreolite moisture repellent Transparent Preservative to protect the material against absorption of moisture.

waterproofing

Where strip flooring is to be installed on a ground floor or basement, where water or moisture may seep through the concrete floor slabs, an approved water-proofing membrane shall be provided between the concrete slab and the blocks. The walls extending below the ground shall be properly waterproofed at time of construction by the mason contractor.

installation

Interiors of buildings shall be dry and, if weather is cold, heated before flooring is installed. Flooring shall be stored as long as possible in well ventilated piles in the building under actual conditions of heat and humidity prior to installing.

Blocks shall be installed on thoroughly seasoned concrete, finished smooth and level (a smooth wood float finish is satisfactory) exactly the depth below the finished floor level corresponding with the depth of the block used. Concrete base shall be thoroughly cleaned of dust and dirt and given a prime coat of Kreolite Priming Oil. After Priming Oil has dried, it shall be given a thin even coating of Kreolite Bituminous Cement or Adhesive.

Upon the base, Kreolite End Grain flexible Strip Block Flooring shall be laid with each strip interlocked to the adjoining strip by tight fitting, galvanized crimped steel wire splines, which over-lap at least six inches across end joints. Expansion joints one inch in width shall be formed around all columns and against all walls. These spaces shall be filled with Kreolite Expansion Joints.

Conditions of temperature and humidity in the room must be proper for the application of the Finish.

finishing

Industrial Finish After laying, Kreolite Strip Flooring shall be sanded once over with an electric sanding machine and given two coats of Kreolite Penetrating Seal, applied 24 hours apart.

The floor should be cleaned periodically with "Kreolite Strip Wood Block Floor Cleaner" and polished with an electric floor polishing machine.

Finish for Schools, Auditoriums, Gymnasia, etc. Surface of floor, after installation, shall be sanded smooth with an electric sanding machine. Kreolite Filler shall then be carefully squeegeed over the surface and rubbed in, until joints are completely filled; surplus filler shall be removed.

After at least twelve hours there shall be applied 2 coats of Kreolite Gymnasium Varnish, applied 24 hours apart. The floor shall be polished or buffed after the final coat with an electric polishing machine. Conditions of temperature and humidity in the room must be proper for application of finish. Finish shall not be applied until all other subcontractors have left the room, and in no case under adverse weather conditions. Additional finish coats of Kreolite Gymnasium Varnish may be applied, at additional cost.

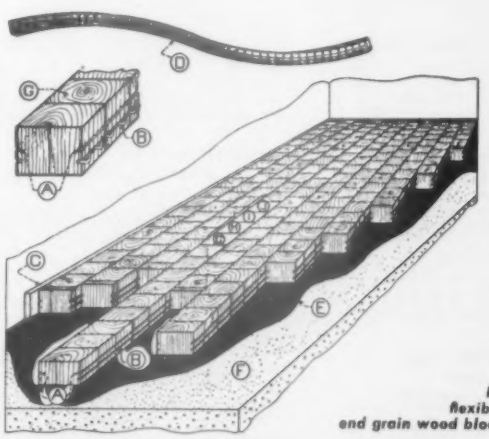
Finished Kreolite End Grain Flexible Strip Block Floor shall be protected from dirt and damage by covering with tarpaulins, sawdust or building paper until building is ready to turn over to Owner.

maintenance

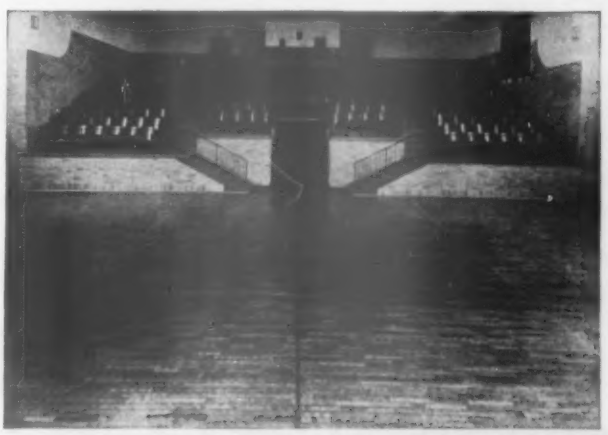
Kreolite Strip Block Floors should be cleaned and polished periodically, at least once every thirty days, with Kreolite Strip Wood Block Floor Cleaner, applied with spray or a lamb's wool applicator and polished with an electric polishing machine.

note For areas under 1800 sq ft consult manufacturer for recommended installation procedure and materials.

A. Metal wire truss binding individual blocks into monolithic plank or strip.
B. Metal spline binding individual strips.
C. Expansion joint laid flush with surface of floor.
D. Flexibility—follows surface of subflooring.
E. Waterproof coating between concrete and strips.
F. Smooth finish concrete foundation.
G. Smooth machine surfaced during manufacture.
H. Manufactured from kiln dried Yellow Pine.
I. Treated with colorless, odorless, waterproofing preservative maintaining natural light color of wood.
J. Laid with tough end grain up. Blocks run full depth of strips, from top to bottom, each block being anchored to the base, in a bed of mastic.



Kreolite flexible strip end grain wood block floor



Olney School, Wood County, Ohio, has Kreolite flexible strip block floors laid in the auditorium, stage, lecture and demonstration rooms, laboratories and carpenter shops. architect—Howard Manor, Grand Rapids, Ohio. contractor—James I. Barnes Construction Co., Springfield, Ohio.

KREOLITE services

chemical division

For laboratory determination, and development of improvements in timber treatment, treating processes and Kreolite products.

engineering division

For consultation, and design of materials using products made or supplied by the Jennison-Wright Corporation.

service division

For installation of Kreolite Wood Block Floors on contract basis, or supervision of installation.

research division

For periodical inspection of installations of Kreolite Wood Block Floors and other Kreolite products.

other KREOLITE products

pitch

Binder for Kreolite creosoted and flexible strip wo block floors as well as a filler for creosoted wo blocks.

road tar

For sale primarily to state and county highway co missions in Ohio, Indiana and Michigan.

creosoted lumber and piling

For bridges, docks, framing, construction. Furnish either rough or sized.

cross and switch ties

For railroads and industries throughout the U.S.

branch offices

ALBANY 5, NEW YORK
Geo. L. Dresser
P.O. Box 5052
Roessleville Branch
Phone—Albany-2-3359

ALLENTOWN, PA.
Morris Black & Sons
3rd and Union Streets
Phone—Hemlock 7201

BETHLEHEM, PA.
Morris Black & Sons
902-26 14th Ave.
Phone—University 7-4631

BIRMINGHAM, ALA.
J. Earl Glenn
700 6th Avenue N.
Phone—54-2547

BOSTON 10, MASS.
H. J. Kaswell
80 Federal Street
Phone—Liberty 2-2467

BUFFALO 2, N. Y.
A. H. Weaver Lumber Co.
715 Erie Co. Bank Bldg.
Phone—Cleveland 1031

CHARLOTTE 1, N. C.
Edwin C. Boyette & Son, Inc.
P.O. Box 1971
216 E. Morehead St.
Phone—6-2454

CHICAGO 1, ILLINOIS
Sidney S. Clark
Lou Adams
64 West Randolph St.
Phone—State 2-1216

CINCINNATI 26, OHIO
Cincinnati Floor Co.
Eastern & Linwood Aves.
Phone—East 1837

CLEVELAND 15, OHIO
Arthur D. Andrews
1737 Euclid Avenue
Phone—MAin 1-4000

DENVER, COLORADO
Building & Maintenance Co.
1963 Wazee Street
Phone—Keystone 2371

DETROIT 26, MICHIGAN
Bert Jones Jack Martin
823 Penobscot Bldg.
Phone—Woodward 1-2451

FORT WORTH 4, TEXAS
Chas F. Williams Co., Inc.
328 Lipscomb Street
Phone 2-6363

GRANITE CITY, ILL.
H. M. Newton, J. E. Corrie
E. J. Littleton, Stanley Bell
St. Louis Exchange
Phone—Glenview 2-3114, 2-3115

KANSAS CITY, MISSOURI
Glen E. Soulon,
Charles H. Anderson
Floors, Inc.
7410 Wornall Rd.
Phone—Jackson 5390

MINNEAPOLIS, MINN.
John W. Ladd, Charles H.
Anderson, Floors, Inc.
5940 S. Nicolette Ave.
Phone—Re. 8228

NASHVILLE, TENN.
S.C. Ewing,
1523 Demonbreun St.
Phone—5-9992

NEW YORK 17, N. Y.
Daniel W. Thomsan
Room 603
40 East 49th Street
Phone—Murray Hill 8-3345

NORTH HAVEN, CONN
R. E. Copeland
381 State Street
Phone—New Haven, Chestnut 8-4479

OMAHA, NEBRASKA
Trustin-Carlson Associates, Inc.
2300 N. 18th St.
Phone—Atlantic 4586

PHILADELPHIA 2, PA.
F. W. Weir
Fred Klippel
1040 Commercial Trust Bldg.
Phone—Rittenhouse 6-8469

PHOENIX, ARIZONA
Production Service Associates
Box 7124

PITTSBURGH 22, PA.
A. D. Andrews
200 Magee Building
Phone—Atlantic 1-6056

RICHMOND 3, VIRGINIA
W. Morton Northen
P. O. Box 457
608 N. 17th Street
Phone—2-6507

ROCHESTER 5, N. Y.
Hutchison-Rathbun, Inc.
95 Augusta Street
Phone—Hamilton 2820

SCRANTON, PA.
Fred R. Evans
314 Madison Avenue
Phone—7-9691

ST. LOUIS, MISSOURI
H. M. Newton, J. E. Corrie
E. J. Littleton, Stanley Bell
St. Louis Exchange
Phone—Glenview 2-3114, 2-3115

SYRACUSE 2, N. Y.
Adams Floor Company
317 State Tower Bldg.
Phone—Syracuse 2-9102

TRENTON, NEW JERSEY
The Kennedy Lumber Co.
1010 East State St.
Phone—2-3151

YORK, PENNSYLVANIA
C. H. Strayer
Richard P. March, C. E.
214 North Beaver St.
Phone—84142

WESTERN DISTRIBUTOR

LOS ANGELES 6, CALIF.
A. B. Rice Company
P.O. Box 20726,
Pico-Heights Station
Phone—Dunkirk 8-5176

CANADIAN DISTRIBUTOR

MONTREAL 32, QUEBEC
Gordon A. Elmslie & Co.
Ville LaSalle
105 Elmslie Street
Phone — Dexter 8465, 8467

The JENNISON-WRIGHT Co

2463 Broadway - Toledo 9, Ohio

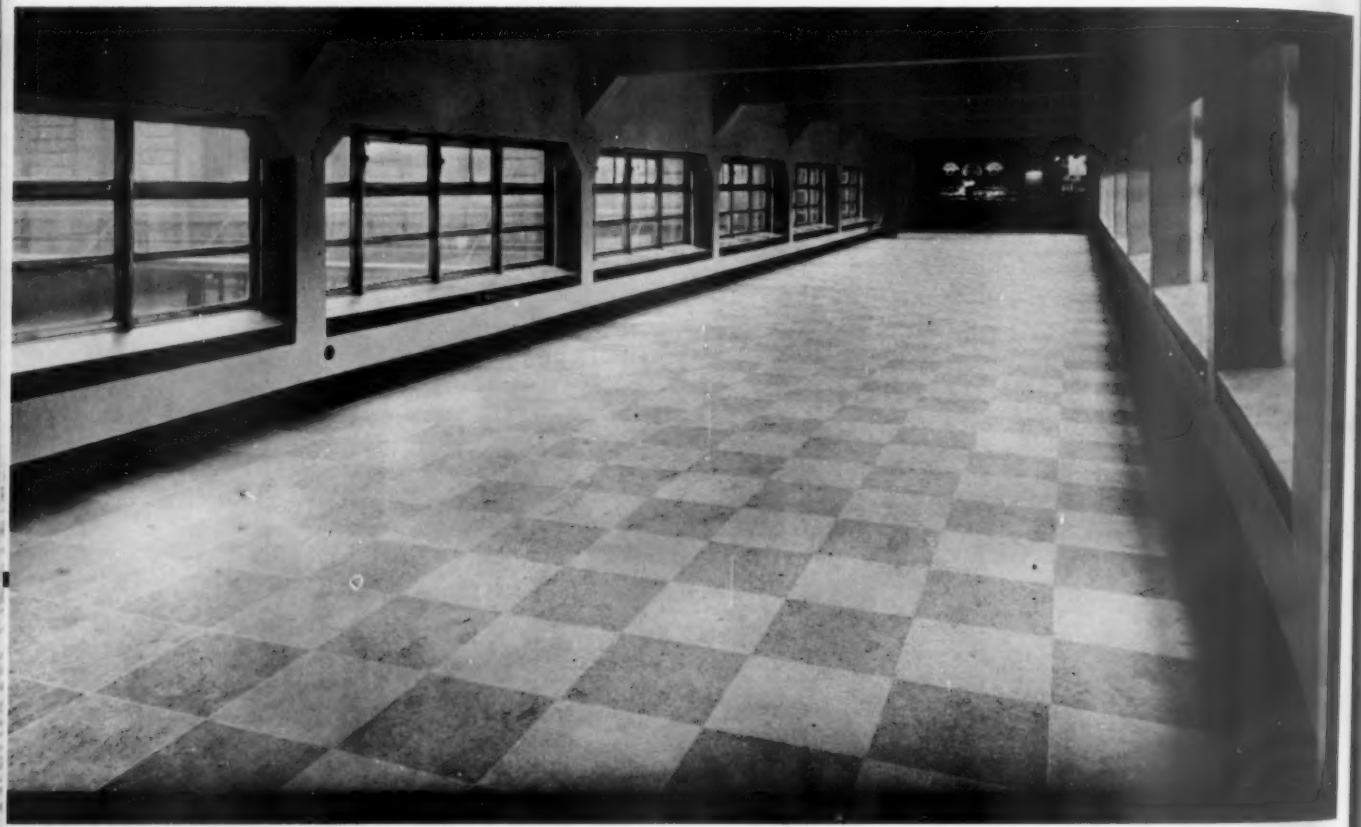


Bridge from the past ~

to the future ------→

200,000,000 PEOPLE LATER

Approximately 86,000 people a day have used this bridge between the Chicago Daily News Building and the Northwestern Depot for the past 25 years. According to the owners, and as the photo shows, today it's as good as new.



Terrazzo repays builders' foresight with long life and low upkeep

All-time favorite for long-time service, Terrazzo meets the most rigorous traffic demands. Useful for floor, baseboard, wainscot, or stairway, its smooth, unbroken surface cleans easily. Terrazzo is the nearest thing to erosion-proof available today. You can specify Terrazzo—and forget!

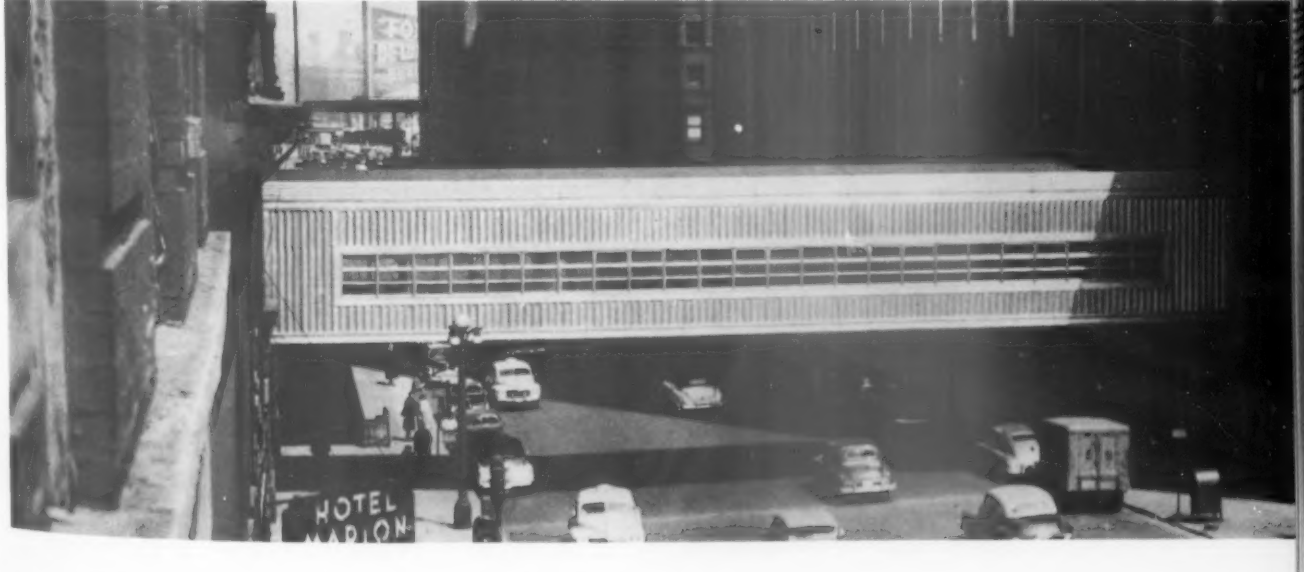
TERRAZZO FLOOR

marble hard and concrete durable

shows little wear and no cracks (despite the suspended structure) after 25 years and after 200,000,000 people have trod it.

Chicago architects Holabird, Root and Burgee specified Terrazzo for this passageway over Canal Street. Versatile as the architects' imagination, Terrazzo has withstood the ravages of time and usage with minimum maintenance and maximum service.

Exterior view of bridge



Advantages of **TERRAZZO**

1. ECONOMY.

Initial cost is offset by freedom from repairs, replacements, and excessive upkeep over a period of years. This is usually far less than the long-range cost of other types of floors, since repairs, replacements, and upkeep are added to their initial cost.

2. COMFORT.

Finished TERRAZZO is easy to walk on, less slippery than any waxed surface.

3. CLEANLINESS.

TERRAZZO can be sealed so as to be practically non-absorbent. Its smooth, unbroken surface cleans easily, harbors no accumulation of germs, paves the way to aseptic cleanliness.

4. COLOR AND DESIGN.

TERRAZZO has warmth and beauty. Specify any design, pictorial or geometric, in virtually any combination of colors.

5. DEPENDABLE INSTALLATION.

This Association's objective is to see that TERRAZZO installations turn out exactly as wanted. Write us today for complete information on the above points, or see our advertisement in Sweet's.

THE NATIONAL TERRAZZO AND MOSAIC ASSOCIATION, INC.

711 14th Street, N.W. Washington 5, D.C.



Where chemical abuse is prevalent, Vina-Lux answers the floor problem.

VINA-LUX REINFORCED VINYL TILE

AZPHLEX VINYLIZED GREASEPROOF TILE

DURACO GREASEPROOF INDUSTRIAL TILE

AZROCK ASPHALT TILE

AZROCK PRODUCTS MAKE BETTER SCHOOL FLOORS

AZROCK

ASPHALT TILE

School traffic and usage constitute a rugged test for any type of flooring. Only a real tough floor can withstand the scuffling, pounding traffic of school children. Azrock asphalt tile is that kind of flooring. It's a *better* asphalt tile, with a smoother, easier-to-clean surface, and with excellent resistance to alkali and moisture. Yet, Azrock costs no more than ordinary Asphalt Tile.

Azrock has been used widely in all types of school buildings for more than twenty years. Many of these floors are still serving today — still retain their good looks. They are a strong testimonial to the merits of Azrock as a long-wearing, economical, easy-to-clean floor.

Azrock is made in a wide variety of 27 attractive marbleized and solid colors, in two thicknesses and in five sizes. Wherever school floors call for low first-cost plus long wear, Azrock fills the bill. It will stretch your floor budget farther than any other type of flooring

Azrock provides this classroom with a bright, attractive floor — with light reflecting colors that help children see better



Azrock is built to take the severe punishment you may find in rooms like this combination gymnasium-auditorium.





-Lux is ideal for use in areas ...t to heavy usage such as the ...oom shown at the right.

...ooking fat, food greases and ... kitchen traffic have no detri... effect on this beautiful, ...ry Vina-Lux floor in the ... kitchen shown below.



Vina-Lux®

REINFORCED VINYL TILE

Vina-Lux adds beauty, smartness and top-drawer quality to public lobbies, community rooms, libraries and other dress-up areas of the modern school. It offers unrivaled color brilliance and variety with 18 stunning marbleized and 2 solid colors—light, bright colors with glamorous decorative appeal.

Vina-Lux has an amazing surface—a surface smoother than a baby's cheek yet tougher than fine leather—a surface that shrugs off dirt, oil, grease and most acids and alkalis. Vina-Lux can give you school floors that clean without hard scrubbing, gleam without waxing. Ordinary damp mopping keeps Vina-Lux looking new and bright in less time, with negligible cost.

Vina-Lux has stubborn resistance to indentation—a tough, rubber like flexibility that adds surprising strength and comfort underfoot—a dense, interlaced structure that means years of extra wear. This remarkable vinyl-asbestos tile flooring has about everything you could ask for in a school floor.

...VALDE ROCK ASPHALT COMPANY

Frost Bank Building • San Antonio, Texas

Makers of AZROCK • AZPHLEX • VINA-LUX • DURACO

"Azrock Makes Fine Floors"

AZROCK FLOORING PRODUCTS

AZPHLEX

VINYLIZED GREASEPROOF TILE

Here is a brand new concept in greaseproof tile flooring. The magic of vinyl resin has been added to Azphlex Thermoplastic Tile to give it added grease resistance, better colors, smoother surface, and greater resistance to abrasive wear. Azphlex is the only greaseproof tile in its price class that offers all of these qualities.

Here indeed is the perfect answer to the problem of what flooring to use in domestic science and home economics classrooms, school cafeterias and lunch rooms, and any other areas where food is prepared or served. Vinylized Azphlex is available in remarkably light colors that adapt themselves to modern school decor. For the first time you can now have a greaseproof floor that is both handsome and enduring under the exacting conditions that exist in food-serving and preparing areas.

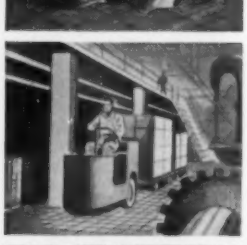
Many school architects are finding Vinylized Azphlex their choice for other areas in the school such as classrooms, auditoriums and corridors. Vinylized Azphlex means lower maintenance cost and greater light reflectance—both essential to modern school programs.



Vinylized Azphlex adds beauty and low maintenance cost to modern home economics room.

DURACO GREASEPROOF INDUSTRIAL TILE









Duraco has been designed to provide a proper floor for vocational rooms in schools. It is another example of an Azrock Product engineered to solve a special school floor problem.

Duraco will not soften or disintegrate from abuse by lubricating oils, gasoline or other commonly-used petroleum products. Duraco is tough and rugged—made to withstand light trucking of materials as well as the dropping of tools or other heavy objects.

For woodworking shops and for metalworking areas this floor is ideal. In addition, it has a smooth, dense surface that will not permit dirt, grease and grime to wear-in — hence, it is easy to clean at minimum expense. Duraco floors are as attractive as they are sturdy. You can choose from 6 colors — 2 solid and 4 marbleized.

School administrators and architects are urged to write for samples, technical data and a copy of the Azrock Installation Manual if desired. Such requests will be promptly and courteously handled.

SOLD AND INSTALLED BY
APPROVED AZROCK FLOORING CONTRACTORS

CS—154—13.5M

AMERICAN CITY BUREAU

221 North LaSalle Street, Chicago 1, Illinois and 470 Fourth Avenue, New York 16, New York

Charter Member American Association of Fund-Raising Counsel

1913



1955

COLLEGES, UNIVERSITIES AND SCHOOLS REPRESENT THE BEST EXAMPLE OF LONG-RANGE SUSTAINED PHILANTHROPIC IMPULSES.

THE AMERICAN CITY BUREAU, RECOGNIZING THAT EVERY CAMPAIGN TO INCREASE THE ASSETS OF ANY INSTITUTION IS BOTH A LABOR OF DEVOTION AND A TAX UPON EVERY RESOURCE, CALLS UPON ITS FORTY-TWO YEARS OF EXPERIENCE IN ITS ASSOCIATIONS WITH VOLUNTEER GROUPS. THE SUCCESSFUL GUIDANCE AND COUNSELLING OF AMERICAN CITY BUREAU FUND-RAISING IS EVIDENCED BY MORE THAN 3,300 CAMPAIGNS.

WHEN YOUR INSTITUTION IS IN NEED OF INCREASED FACILITIES, ENDOWMENT, OR CURRENT INCOME THE AMERICAN CITY BUREAU WILL WELCOME THE OPPORTUNITY TO CONSULT WITH YOU WITHOUT OBLIGATION.

American City Bureau

(ESTABLISHED 1913)

THERE IS NO SUBSTITUTE FOR EXPERIENCE

AMERICAN ABRASIVE METALS CO.

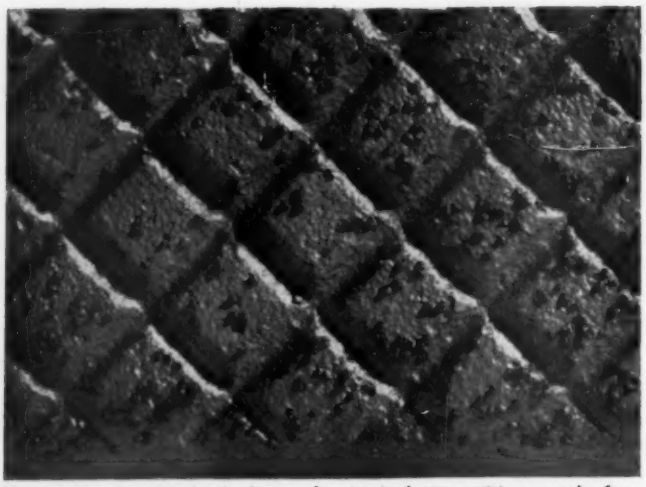
Irvington 11, N. J. Offices in Principal Cities

MAINTENANCE FREE, NON-SLIP PRODUCTS FOR STAIRWAYS AND FLOORS

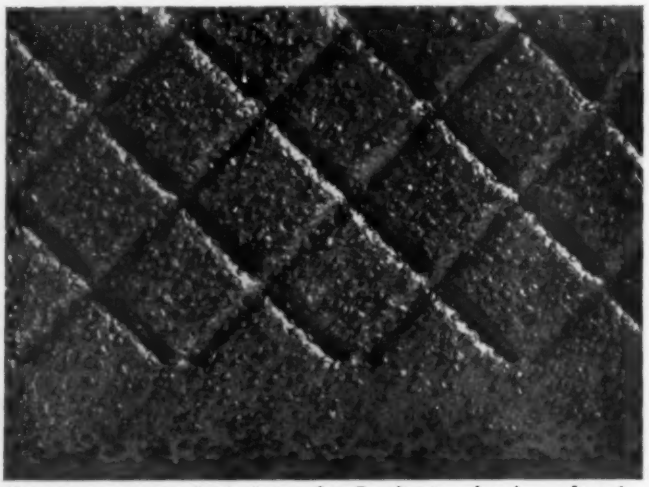
Glance at the photographs and

See FERALUN® superiority

No Other Tread Equals Feralun in Safety and Durability



Here is an unretouched photo of a *typical competitive tread* after acid test. (Acid is used to eat away the metal base so as to expose the actual abrasive content of the tread.) Note the meager amount of abrasive and spotty distribution.



Here is an unretouched photo of a *Feralun tread,* taken after the same exposure in the acid bath. Note the full and even distribution of abrasive . . . for greater safety, longer wear.

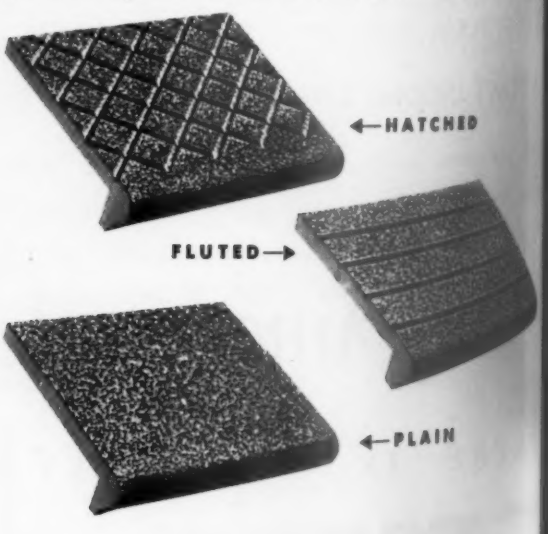
The life and non-slip effectiveness of any abrasive tre is approximately proportional to the amount of abras embedded in the surface. Note the quantity of abras in the Feralun tread and the evenness of its distributio Note particularly how the abrasive in the Feralun tre extends over the nosing edge where the danger of sli ping is greatest. The pictures tell the story. These trea were acid-etched to remove the top portion of the ir matrix without disturbing the abrasive grain. We urg you to make this simple test yourself and will gladly se you full instructions on how to do so.

Feralun treads are made in three surfaces — hatche fluted or plain — and are available as full treads or nos ings; also as thresholds and floor plates.

Feralun has been widely used in schools and othe public buildings. It has no equal for non-slip safety durability, freedom from maintenance.

Cast to fit, Feralun is quickly installed in either new or repair installations. Write for Feralun Bulletin today

Available also in Bronze (Bronzalun), Aluminum (Alumalun) and Nickel Bronze (Nicalun).



Trowel On FERROX® for Safety

NON SLIP • LOW COST • LONG LASTING
EXCELLENT FOR DANGER AREAS

Ferrox is a plastic, abrasive, non-slip compound that makes indoor or outdoor walkways safe regardless of whether they're slippery, wet or oily. It's easy to apply, goes on with a trowel, dries in 6 to 8 hours. One gallon of Ferrox covers from 30 to 40 sq. ft., thickness about 1/16". It comes in red, black, gray, blue and green.

Ferrox has given years of service. It may be applied over concrete, wood, stone, metal or practically any other surface. A few of the many school applications are pictured here. Others include building entrance ways, floor areas around edges of swimming pool, shower stalls and locker rooms.



Ferrox for safe footing near dangerous machine (Webster Junior High School, Newark, New Jersey)



Ferrox on steep ramp (Floral Park School, Floral Park, Long Island, New York)



Ferrox in sloping corridor (Floral Park School, Floral Park, Long Island, New York)



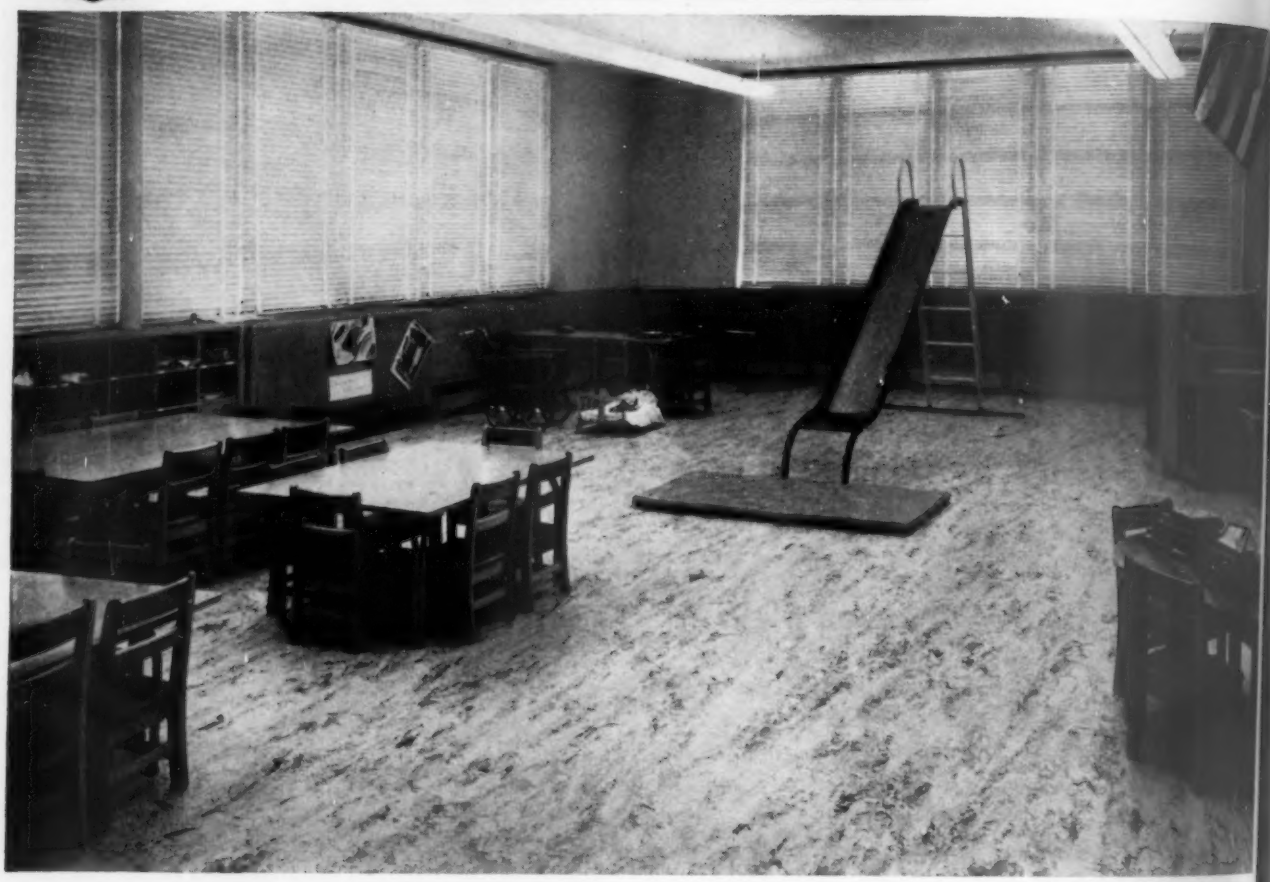
Ferrox in industrial arts shop (Webster Junior High School, Newark, New Jersey)



Ferrox in auditorium aisle (Floral Park School, Floral Park, Long Island, New York)

CONGOLEUM NAIRN INC.
GOLD SEAL® Floors and Walls

INLAID LINOLEUM • RANCHTILE® LINOLEUM • VINYLFLOR • VINYLTOP • LINOLEUM, VINYL, VINYLBEST, CORK, RUBBER AND ASPHALT TILES • CONGOLEUM® AND CONGOWALL® ENAMEL-SURFACE FLOOR AND WALL COVERINGS



School days will never faze this floor...

GOLD SEAL INLAID LINOLEUM

America's finest inlaid linoleum . . . the *only* one made by the natural oxidation process for greater resilience and durability!

It's tough! So tough, installations over 30 years' old are still giving great service.

Easy to maintain! Highly resistant to ordinary grease, oils, chalk, dirt, grime, scuffing. Dense, satin-smooth surface will rarely pit, scar, or chip. Cuts maintenance time, troubles and costs.

Resilient! Deadens floor noise. Resists permanent indentation from heavy furniture. Comfortable! Reduces foot fatigue.

Colorful! Wide range of colors to harmonize with any decorative scheme. Suggests hundreds of handsome, special designs to direct traffic flow, separate areas.

Stays colorful! Colors are *inlaid* for long-lasting beauty!

Economical! Low maintenance! Initial costs can be amortized over long period of time. Lasts years longer than low-cost floors.

Guaranteed! Gives you the famous Gold Seal Guarantee . . . satisfaction or your money back.

Specifications! Commercial Gauge (⅛") for heavy traffic areas. 6' wide by-the-yard and 9" x 9" tile. Burlap back. Patterns: 20 Veltone®; 4 Plain, 6 Battleship; 5 Jaspe. Install over suspended wood or concrete subfloors. Specially designed Ranchtile Linoleum in 9 textured patterns is also available for installation in schools over concrete slabs at ground level . . . even with radiant heat.

LOXIT SYSTEMS, INC.
1217 W. Washington Blvd., Chicago 7, Ill.

There's a place for LOXIT in your plans...



LOXIT FLOOR-LAYING SYSTEM

It's SO simple and SO practical. It requires NO nails, NO wood sleepers, NO adhesives. Loxit solves the problem of wood floors laid on concrete.

LOXIT CHALKBOARD SYSTEM

Includes LOXIT-TYLAC Rite Green Chalkboards and Tackboards, LOXIT TRU-SNAP All-Aluminum Trim and a complete line of accessory items.

LOXIT VICTORY ACOUSTICAL SYSTEM

The new improved Loxit VICTORY Acoustical Suspension System is really three systems in one—"X" Regular*—"Y" Surface Applied—"Z" Combination.

WRITE FOR CATALOG



Consider the many proven advantages of the Loxit Systems—how they simplify construction problems, meet unusual conditions, assure permanent beauty, and reduce maintenance costs. In 1953, more new schools, gymnasiums, field houses, office and factory buildings profited by these advantages than ever before. All Loxit Systems have one thing in common: they are simple in principle. Because of this, they are easy to erect and assure years of trouble-free service. Keep this in mind in your own planning.

ASK YOUR ARCHITECT — HIS TRAINING AND EXPERIENCE IS YOUR ASSURANCE OF GOOD DESIGN AND GOOD CONSTRUCTION AT THE RIGHT COST.

AMERICAN MASON SAFETY TREAD CO.

Lowell, Mass.

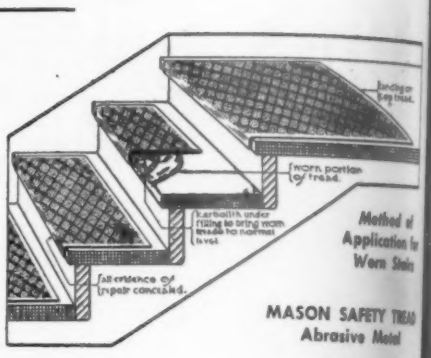
REPRESENTATIVES IN PRINCIPAL CITIES OF THE UNITED STATES AND CANADA

MASON SAFETY TREADS

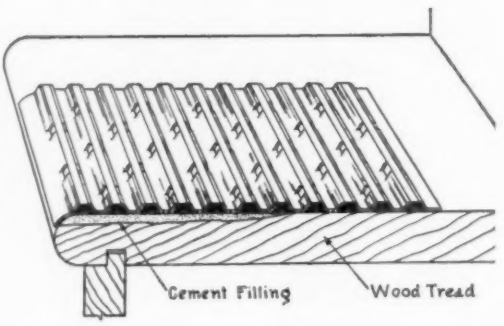
Abrasive Metal — Ribbed Type — Universal

For Stairways · Stair Landings and Ramps

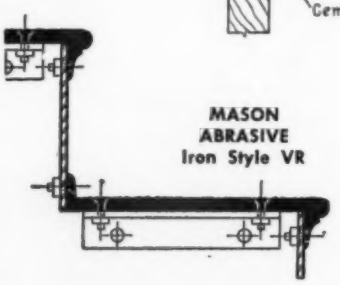
Over Fifty Years of Service to Educational Institutions



For years **Mason Safety Treads** have filled a very definite need in preventing accidents on stairways, entrances and other heavy-traffic walkway surfaces. With Mason Treads, whether you install the Abrasive Metal, the Ribbed Type in brass or aluminum, or the Universal Type, your SAFETY problem will be satisfactorily solved. All types can be quickly and economically installed by your own workmen.



MASON SAFETY TREAD
Universal Type



MASON
ABRASIVE
Iron Style VR

At Right and Below:
SELF-SUSTAINING TREADS
Used with Steel Risers

When you specify **Mason** products, you are assured of receiving **individualized attention** to your particular problem, **intelligent engineering service**, and a **quality product at a fair price.**



SPECIFICATIONS—SAFETY TREADS

New Steel Construction—All stair treads and platforms as shown on plans shall be Mason Abrasive Iron Style VR (or other style as selected) with cross-hatched (plain or fluted if preferred) surface as manufactured by the American Mason Safety Tread Company, Lowell, Mass. Suitable steel supports and stringers with carrier angles shall be provided for securely bolting treads and platforms in place. Sheet steel riser plates (state gauge) shall be bolted to nosings and riser lips of the Safety Tread. Thickness of treads and platforms shall conform to the manufacturer's established standards.

New Concrete or Pan-Filled Construction—All stair treads including floor and landing-level steps shall be provided with Mason Abrasive Iron Safety Treads Style M (or H or G) cross-hatched surface as manufactured by the American Mason Safety Tread Company, Lowell, Mass. (Mason Universal Type II, Style B Safety Tread, steel with lead inserts, may be substituted.) Safety Treads shall be 3" wide (minimum) and extend from stringer to stringer (for reinforced concrete construction, safety treads may extend to within 3 inches of stringers). Standard concrete anchors, spaced according to manufacturer's recommended practice, shall be used to secure safety treads in place.

TYPICAL MASON INSTALLATIONS

HARVARD UNIVERSITY
Cambridge, Mass.
MONTREAL WEST HIGH SCHOOL
Montreal, Quebec
BROWN UNIVERSITY
Providence, R. I.
PROVINCIAL NORMAL SCHOOL
Fredericton, N. B.
CULVER MILITARY ACADEMY
Culver, Ind.
UNIVERSITY OF MINNESOTA
Minneapolis, Minn.
U. S. MILITARY ACADEMY
West Point, N. Y.
U. S. NAVAL ACADEMY
Annapolis, Md.
UNIVERSITY OF FLORIDA
Gainesville, Fla.
PRINCETON UNIVERSITY
Princeton, N. J.
LOUISIANA STATE UNIVERSITY
Baton Rouge, La.
WILLIAMS COLLEGE
Williamstown, Mass.
AND HUNDREDS OF OTHERS

Write for copy of the MASON catalog—sent free on request to any school official or architect.

THE TILE-TEX DIVISION

The Flintkote Company

1234 McKinley Avenue, Chicago Heights, Illinois



Get the EXTRA ADVANTAGES of Tile-Tex Floor and Wall Tile Products

Flexachrome*, Vitachrome*, Tuff-Tex*, Tile-Tex*, Holiday, Modnar**, and Mura-Tex*—one will exactly fit your needs**

You have over 80 appealing floor tile colors to choose from in the Tile-Tex line. And you have an exceptional selection of floor tile sizes. Both decorative and functional design possibilities are unlimited.

Tile-Tex Products are good all the way through—both the color and marbleizing go clear through each tile. In Mura-Tex you have a perfect tile wainscoting material in 20 colors.

FLEXACHROME VINYL PLASTIC-ASBESTOS FLOOR TILE

The ultimate in vinyl plastic resilient flooring—the answer for all areas in your school. Flexachrome combines exceptional beauty with exceptional durability. And Flexachrome never needs waxing.

It's greaseproof. Resists acids and alkalis, Flexachrome has remarkable flexural strength.

Flexachrome has an extremely close textured, dense surface. Very easy to clean and keep clean with daily sweeping and periodic washing.

You can't beat Flexachrome's great selection of colors and sizes—23 rich, bright colors, 4 different tile sizes! (Design possibilities are unlimited.) It's available in 1/16", 3/32", 1/8" and 3/16" thicknesses.

It can be installed above grade, on grade, or below grade—and over wood, steel or concrete.

VITACHROME GREASEPROOF RESILIENT FLOOR TILE

Here is a light-colored, greaseproof floor tile with high resistance to food, greases, and oils. Vitachrome colors have exceptionally high light reflectivity.

Excellent for use in school dining rooms, kitchens, cafeterias, pantries, and areas subject to vegetable oils and animal fats commonly found where food is served.

Vitachrome is easy to maintain—requires only the usual daily sweeping, periodic washing, and occasional water-waxing.

It can be installed on grade or below grade and over either wood or concrete.

Vitachrome is available in 10 clean bright colors and in 1/8" and 3/16" thicknesses.

TUFF-TEX GREASEPROOF INDUSTRIAL FLOOR TILE

A greaseproof floor tile manufactured especially for school areas subjected to grease and oil abuse, such as manual training rooms and machine shops. It withstands rolling friction including reasonable trucking abuse.

Tuff-Tex can be installed on grade or below grade and over wood or concrete.

Other industrial features: fire-resistant . . . not affected by moisture . . . safe, sure walking surface . . . high flexural strength . . . high impact resistance . . . easy to install and alter.

Tuff-Tex is available in attractive colors that will brighten up drab interiors. The choice of colors and sizes makes many functional designs possible. Comes in 1/8", 3/16", and 1/4" thicknesses.

TILE-TEX ASPHALT FLOOR TILE

Tile-Tex is a low-priced, high-quality asphalt tile. It combines beauty with durability, minimum maintenance, and long service.

It has a long established reputation for satisfactory performance in schools. An excellent, economical flooring for classrooms, corridors, auditoriums, etc.

Tile-Tex can be installed on grade or below grade and over either wood or concrete.

It's available in an outstanding selection of colors, sizes, thicknesses, and a full line of accessories—26 attractive colors, 3 sizes, and 1/8" and 3/16" thicknesses.

MURA-TEX PLASTIC-ASBESTOS WALL TILE

A new flexible tile wall covering in 3/32" thickness. Ideally suited for school wainscoting and walls. Mura-Tex is greaseproof. Resists acids and alkalis. Can be installed directly on either new or old plaster walls, or properly constructed dry wall construction.

Mura-Tex walls never need painting or redecorating . . . are simple to keep clean and sanitary.

Wide selection of beautiful colors in light-reflecting shades as well as striking, bold colors. Available in 3 sizes and 20 marbleized colors.

SEE YOUR TILE-TEX CONTRACTOR SEE THE TILE-TEX LINE

Your Tile-Tex Contractor will give you complete information and estimates on Tile-Tex floors and wall products. You'll find his name in the classified pages of your local telephone directory.

Or write:

THE TILE-TEX DIVISION, *The Flintkote Company, 1234 McKinley Avenue, Chicago Heights, Illinois.* Samples and color charts free upon request.

Ask him to show you the two latest additions to the Tile-Tex line: HOLIDAY, a gay, cheerful flooring made up of many colorful dots . . . and MODNAR, the newest development in asphalt tile; it comes in a random plank design.

**Trademark of The Flintkote Company

*Reg. U.S. Pat. Off.

TILE-TEX . . . FLOORS and WALLS

MELFLEX PRODUCTS COMPANY, INC.

410 South Broadway, Akron, Ohio • In Canada: 43 Lyngrove St., Toronto 9, Ontario

MANUFACTURERS OF SAFETY MOLDED RUBBER STAIR TREADS, MEL-ISLE FLOORING, RUBBER AND VINYL PLASTIC LINK MATS, ENTRANCE MATS, MATTING, ETC.

MELFLEX SAFETY Molded Rubber Step Treads—*Black or Marbleized Colors . . .*

Black—Heavy Duty Treads. Compounded of special "frictioned" rubber for long, low-cost service and maximum slip-resistance, wet or dry . . .

Approved by Underwriters' Lab., Inc. S.A. No. 833



Square Nose Type

Treads are ¼" thick, molded of "frictioned" rubber to fit over approach edge of step. Built especially for hard, constant, scuffing wear and to assure maximum slip-resistance and noise reduction . . . They can be applied to steps outdoors or indoors on any type of base construction—wood, metal, concrete, terrazzo, tile—without the need of special holding strips. Treads are easily cemented to base with MELASTIC Water-Proof Bonding agent for permanent, trouble-free service. Grid pattern surface acts to drain moist soil and water from tread to provide a SAFE stepping surface wet or dry. They never become slippery or hazardous.

We supply these treads trimmed to fit your step specifications in either curved nose or square nose type. Maximum size in one molded tread—20 inches deep x 72 inches tread width.

Marbleized Colored Treads

Treads are 3/16" thick in marbleized colored patterns that run through to the underside of tread . . . Colors available are: Green with white marbleizing, blue with white marbleizing, brown with tan marbleizing, terra-cotta with white marbleizing, gray with black and white marbleizing and black with white marbleizing. Treads have same tread design as the Heavy Duty Black and can be supplied trimmed to fit your step specifications up to 20" deep x 62" wide.

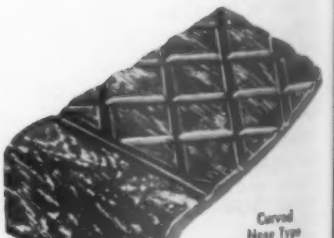


MEL-ISLE

Heavy Duty Ribbed Runner . . .

An exceptionally durable runner material for halls, corridors, locker rooms, ramps . . . Black "frictioned" rubber compound, highly slip-proof, ruggedly resistant to hard, scuffing wear. Supplied trimmed to fit your specifications or in rolls up to 40" wide x 25 yards long. ⅜" thick. Marbleized colored Mel-Isle, 3/16" thick to match marbleized molded treads for step-wells, landings, or floor covering can be supplied in any size up to 36" width x 25 yards long.

MEL-FLOR, smooth-surfaced, plain or marbleized colors in ⅛" and 3/16" thickness for step risers or area coverings can be supplied to your specifications from maximum stock widths of 36" x 25 yards long.



Curved Nose Type

LINK MATS—Custom-Made for any Size or Shaped Area—Links of "Frictioned" Rubber, Colored Rubber or Vinyl Plastic . . .

Links ½" thick are woven on special rust-resisting steel wire. Mats may be made to conform to any area requirements . . . Black Rubber, "Frictioned" Rubber, Colored Rubber and Vinyl Plastic links are used for making these mats to meet varying requirements—for entrances, lobbies, safety mats about machines, cushion mats for kitchens, or serving aisles, oil or grease-resistant mats . . . Complete information will be furnished on all types of mats through our catalog. Write for it.

WOOSTER PRODUCTS, INC.

Wooster, Ohio

HERE IS A NEW REPLACEMENT TREAD TO

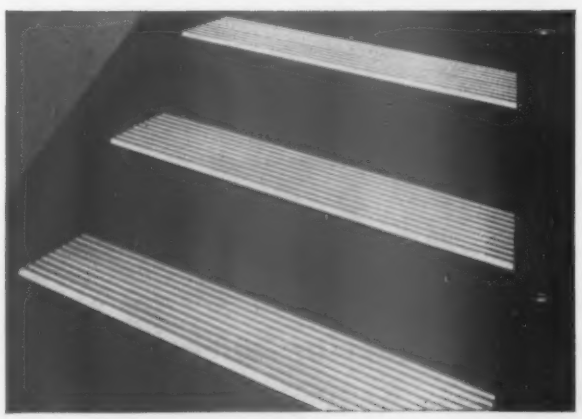
END STAIRWAY MAINTENANCE



'STAIRMASTER'
ALUMINUM
SAFETY TREADS



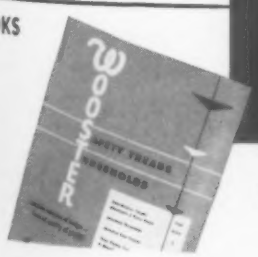
- LIGHTWEIGHT LONG-LASTING ALUMINUM ALLOY CONSTRUCTION
- FOR ALL STAIRS — WOOD, CONCRETE, SLATE, MARBLE, ETC.
- SCIENTIFICALLY DESIGNED ANTI-SLIP METAL TREAD
- POSITIVE ANTI-SLIP SAFETY RIBS
- QUICKLY INSTALLED by your maintenance man or contractor without interruption of traffic





SEND FOR FREE BOOKS

EASY TO ORDER
Standard 9" depth. Length as required. To figure length merely measure your stairs and subtract 6 inches.



Wooster PRODUCTS, INC.
WOOSTER, OHIO

SAFETY TREADS • THRESHOLDS

FOR ALL TYPES OF NEW CONSTRUCTION — CONSULT YOUR ARCHITECT

NATCO CORPORATION

General Offices: 327 Fifth Ave., Pittsburgh 22, Pa., Telephone: GRant 1-9370

DISTRICT SALES OFFICES

Boston (16), Mass., 20 Providence St., Tel. HUBBARD 2-3549—2-3556
Chicago (6), Ill., 205 West Wacker Drive, Tel. FRANKLIN 2-5754
Detroit (2), Mich., 2842 W. Grand Blvd., Tel. TRINITY 3-0310
New York (17), N. Y., 205-17 E. 42nd St., Tel. MURRAY HILL 4-1922
North Birmingham (7), Ala., P. O. Box 5476, North Birmingham Station, Tel. BIRMINGHAM 4-1881
Philadelphia (2), Pa., 1518 Walnut St., Tel. PENNYPACKER 5-0133
Pittsburgh (22), Pa., 327 Fifth Avenue, Tel. GRANT 1-9370
Syracuse (10), N. Y., 225 Kensington Place, Tel. SYRACUSE 76-1569
Toronto (5), Ontario, Canada, 57 Bloor Street, West

The Double Feature building material



"8W" Series Vitritile

Features ground edges—for uniform, narrow mortar joints; and large unit face size (nominal 8" x 16")—for a minimum number of joints in the wall.

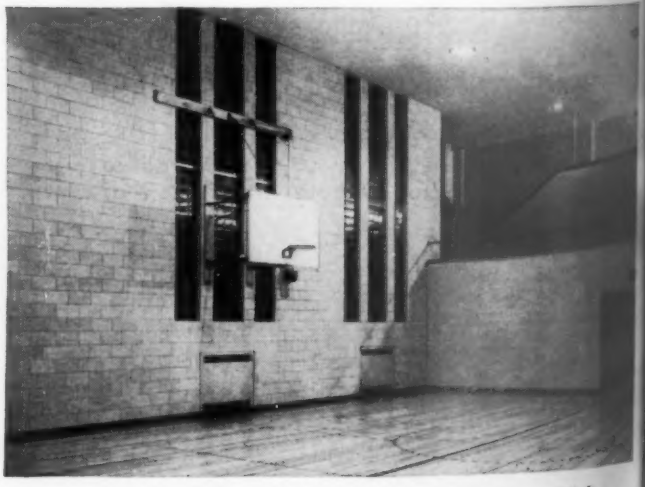


Natco "6T" Series Vitritile in Shades Valley High School, Homewood, Alabama
Architects: Van Keuren, Davis & Company

NATCO structural ceramic glaze

VITRITILE

builds strong, load-bearing walls with interior finish of life time beauty— all in one operation



Natco "8W" Series Vitritile in Wauwatosa High School, Wauwatosa, Wisconsin
Architects: Herbst & Kuenzle

Many schools throughout the country are enhanced with Natco Structural Ceramic Glaze VITRITILE—the one building material with a double-barreled construction advantage . . . builds a sound structural wall *plus* a colorful, everlasting wear-proof interior finish—all in one operation!

In lunchrooms, class rooms, locker rooms, corridors, gymnasiums and cafeterias, this versatile material is being specified for its ability to withstand dirt, vandalism and marring. And it will look as beautiful years ahead as it does when erected—inexpensive washing with soap and water is all the maintenance it ever needs.

Architects, builders and contractors are sold on the many service advantages of durable Natco Vitritile. There's less labor, less cutting, less material waste at erection. This flexible unit adapts to any design idea—offers a wide selection of colors too. Put double-feature Natco Structural Ceramic Glaze Vitritile to work on your school building jobs. Time-tested installations prove it lowest in cost over the years.

17 STRATEGICALLY LOCATED CLAY PLANTS

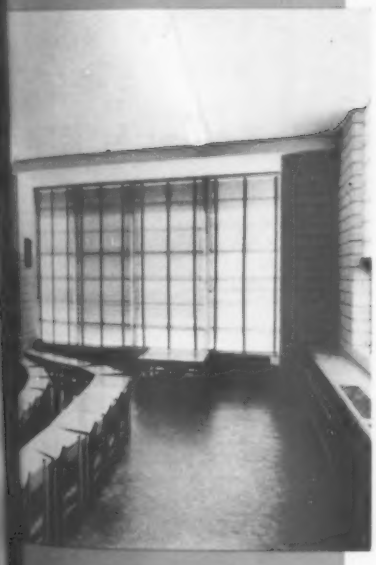
B-3/Me

ramic glazed

STRUCTURAL FACING TILE

by Metropolitan







IN SCHOOLS AND HOSPITALS Metropolitan Structural Clay Facing Tile regularly gets "first call" . . . because it so effectively combines functional utility with the permanent beauty of a ceramic-glazed surface that assures correct light reflectivity, is easily cleaned and economically maintained. The wide selection of "engineered colors and trim shades" makes it possible to exactly meet the specifications of color researchers and there is the "added insurance" of complete fire safety.

WHERE IT FITS:

Metropolitan glazedware works to the advantage of designer, contractor and owner whenever long-range economy and proven dependability is essential. An almost limitless range of application includes school corridors and classrooms, lunchrooms and laboratories, personnel lounges and washrooms; for hospitals, operating rooms, service areas and corridors are among the most popular uses. In fact, "somewhere in every building, everywhere in some buildings" there's a "right spot for glazedware."

HOW INSTALLED:

With glazed structural facing tile, you build and finish the wall in a single operation; at moderate cost, assuring premium wall performance for the life of the building. Brickmasons prefer glazedware for ease of handling, and Metropolitan literature provides basic wall section and construction detail drawings, along with bonding and coursing data. All informational literature is free on request.

WHY IT PAYS:

In addition to permanent beauty, proven utility and fire-safety, Metropolitan Ceramic Glazed Structural Facing Tile has another important "plus value"—minimum maintenance, scarcely more than occasional wiping with a damp cloth. The glass-hard surface of ceramic glaze on genuine clay not only withstands the toughest abuse of day-in-day-out school application, but meets the even more exacting requirements of hospital use. Savings in time and money actually are multiplied over the years because painting, plastering and replacement are eliminated.

Full Line of Shapes and Modular Sizes — YOUR CHOICE of "Engineered Field Colors" as follows:

VENETIAN CREAM	PEWTER GRAY	DESERT TAN
COLONIAL MOTTLE	GULFSTREAM GREEN	SILVER PINE MOTTLE
BLUSH CORAL	POTOMAC BLUE	SILVER CLOUD MOTTLE
SPRING YELLOW	GLACIER GREEN	

also available for Trim:

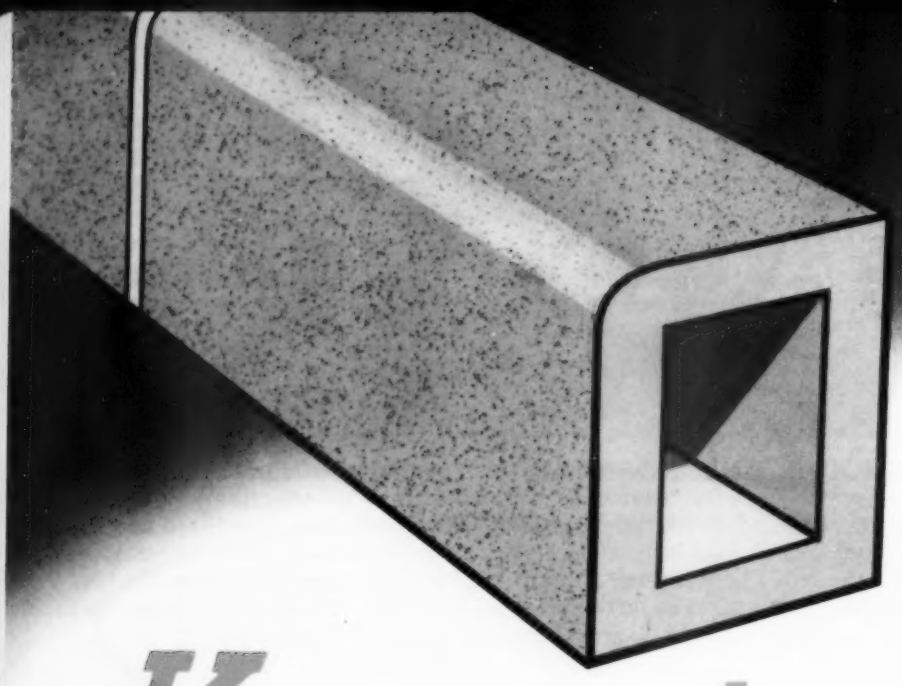
EBONY • FALL RED • HUNTER GREEN

Metropolitan colors are quality-controlled for consistency and correctness. Used in accordance with comprehensive light reflectivity data now available, they represent "true color engineering." Consistent shading of individual units provides an attractively-uniform overall appearance, wall to wall, room to room.

FTI STRUCTURAL FACING TILE INSTITUTE

Metropolitan Brick, Inc.

CANTON 2, OHIO



Keramet

STRUCTURAL FACING TILE FOR "PREMIUM WALLS AT BUDGET COSTS"

Keramet color and simplified line of shapes was developed by Metropolitan to give "modest budgets" the advantages of glazed structural facing tile. Using Keramet, you build and finish a wall faster and at lower cost than ever before possible with ceramic glaze on genuine clay. Substantial savings are due to lower initial cost and less time for construction.

With Keramet, you and your clients are sure of:

1—SAVINGS in design, detailing and installation time and cost because of simplified shapes and color.

2—ELIMINATION of painting or any refinishing and REDUCTION of general maintenance to absolute minimum.

3—PREVENTION of unsightly wall cracks due to contraction and expansion—a special advantage for both specifier and owner, made possible by ceramic glaze on *genuine* clay.

Metropolitan Keramet is manufactured in an attractive speckled satin-mat finish . . . in a neutral shade that complements any color scheme. Samples are immediately available on request.



Jefferson Hospital

Keramet is featured in the corridors of Jefferson Hospital, Philadelphia, and the entire exterior is faced with Metropolitan Unsanded Yellowstone Normans; Architect—Vincent G. Kling; Mason Contractor—John B. Kelly, Inc.; General Contractor—Wark & Company.



SERIES, MODULAR . . . in a simplified line of shapes (including cove base) t saves detailing and construction time; meets all normal needs

ERSATILE to meet individual creative ingenuity d design needs . . . universal color to harmonize ith any decorative plan

ODULAR for easier detailing on the board, faster b-site installation . . . through simplified shapes; opular 5⅓ x 12" face size.

LAZED for minimum maintenance, maximum sani- tion, low light reflectance and the enduring eauty of ceramic glaze on *genuine clay*

DURABLE to withstand hardest "wear and tear" (from school to hospital to industry) for the life of the building

QUALITY-CONTROLLED for "A" quality, consistent shading, as well as to meet ASTM Standards and Building Code requirements

ECONOMICAL to design with, work with and maintain . . . you BUILD AND FINISH A PERMANENT WALL IN A SINGLE OPERATION

u get Functional Utility and Decorative Design with *Keramet*



TROPOLITAN BRICK INC. • 1019 RENKERT BLDG. • CANTON 2, OHIO

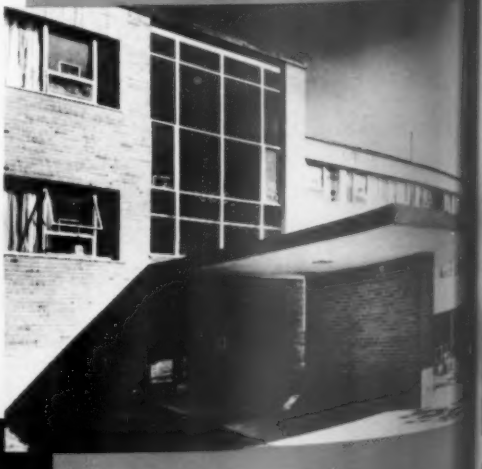
Face Brick

by Metropolitan









. . . your precision material for precision performance

Time-tested brick just naturally lends itself to originality and flexibility of modern design, and with today's choice of "burned-in" colors, permanent textures and sizes the architect has unlimited opportunity to demonstrate his finest skill.

For "those who build," Metropolitan for over 50 years has been supplying the distinctive architectural brick and dependable building brick going into many of the country's finest structures—from schools and churches, business and industry, right into the homes that are the heart of America.

To those who "buy construction," all the inherent advantages of masonry walls (proven by centuries of service) are fully incorporated in Metropolitan Face Brick—backed by the experience of more than half a century of brick-making, precision-produced in modern plants, adaptable to practical "high-style" exposed interiors. You're invited to visit Metropolitan plants at any time, and to meet every design need, production includes . . .

- **STANDARD**
- **NORMAN**
- **"SCR BRICK"**

For complete design integrity and functional utility, you have a wide range of Exclusive Colors and Textures, including Metropolitan's popular

- **DEARBORNS**
- **COLONIAL ANTIQUES**
- **TAVERNS**
- **ARIZONA RANCH**
- **MURRAY HILL MATTS**
- **MISSION MATTS**
- **SUNSET YELLOWSTONES**
- **UNSANDED YELLOWSTONES**

Metropolitan Brick, Inc.

1019 Renkert Building • Phone: GL 6-2751

Canton 2, Ohio

"Serving the American Construction Industry for Over 50 Years"

UNITED STATES CERAMIC TILE CO.

Member: Tile Council of America and The Producers' Council, Inc.

General Offices: 217-L Fourth St., N. E., Canton 2, Ohio

SALES REPRESENTATIVES

ROCHESTER 17, N. Y.
214 Daley Blvd.
Ph: Congress 5514
HOUSTON 6, TEXAS
4601 Montrose Blvd.
Ph: Justin 4335
HOPKINS, MINN.
13006 Excelsior Blvd.
Ph: Hopkins 8379
ST. LOUIS 9, MO.
6943 Purnod Ave.
Ph: Flanders 2-2403

DENVER 6, COLO.
1614 Steele St.
Ph: Freemont 3900
CHICAGO 30, ILL.
6132 N. Moody Ave.
Ph: Rodney 3-1944
JERSEY CITY 6, N. J.
2800 Hudson Blvd.
Ph: Journal Sq. 2-1129
BROOKLYN, 2, N. Y.
16 Court St.
Ph: Triangle 5-7057

BROOKLINE, MASS.
P.O. Box 128
Ph: Longwood 6-6017
CLEVELAND 21, OHIO
1541 Belvoir Blvd. S.
Ph: Evergreen 1-4668
ROUND HILL, VA.
Ph: Bluemont 2701
(Leesburg, Va.)
LOS ANGELES, CAL.
813 N. LaBrea Ave.
Ph: Webster 3-8046

NEW YORK 17, N. Y.
110 E. 42nd St.
Ph: Oxford 7-3985
DETROIT 26, MICH.
936 Book Bldg.
Ph: Woodward 1-2321
BRONX 67, N. Y.
2488 Grand Conc.
Ph: Cypress 5-2822
PHILADELPHIA 8, PA.
401 N. Broad St.
Ph: Lombard 3-6869

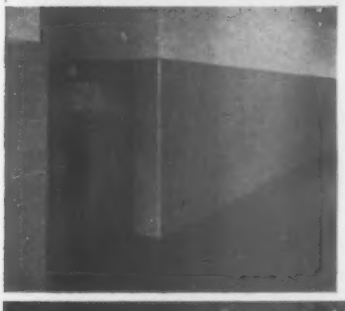
SAN FRANCISCO 3, Cal.
568-7th St.
Ph: Hemlock 1-3406
MADEIRA, OHIO
7528 Miami Rd.
Ph: Sycamore 2938
ATLANTA, GA.
3224 Peach Tree St. N.E.
Ph: Exchange 5372
NEW ORLEANS, LA
1071 S. Jeff. Davis Pkwy.
Ph: Audubon 1300
ALEXANDRIA, VA
423 Hunting Towers Ctr.
Ph: King 8-1959

ROMANY TILES
ARE REAL TILES

—for—

WALLS
TOILETS
SHOWERS
KITCHENS
CLASSROOMS
CAFETERIAS
CORRIDORS
FOYERS
FOUNTAINS
AUDITORIUMS

Romany Buff Body Tile



Glazed wall tile in school areas is usually subjected to rough treatment, even abuse. Room uses often vary and a room originally designed for light duty may be moved into heavy schedule bracket. Tiled wall surfaces of ROMANY Buff Body Tile fully meet these requirements. It is a harder, more highly resistant tile, produced under high temperature fire and with correspondingly low absorption. It has approximately half the absorption accepted in the industry as standard, thereby, providing greatly added strength. With its heavy opaque color glaze, ROMANY Buff Body Tile is practically "boy proof."

Romany Window Sill Tile



The new ROMANY Window Sill Tile is designed to make possible, and economical, a surface of the same general color as other trim in a school room. It provides an exceptional cleanable flat smooth surface for school room exhibits. ROMANY Window Sill Tile is available in all Buff Body colors and is priced to readily compete with most permanent sill materials. It fits well with any painted block wall and reveal, or with plaster. The A-4200 cap (illustrated), detailed into the window jamb, neatly and inexpensively covers the transition between metal window and wall material.

Romany Red Body Tile



ROMANY Red Body Tile offers unusually rugged wear and abuse under conditions where ordinary or standard wall tile has proved inadequate. It is approximately *four times* as hard as ordinary white body tile normally accepted as standard. This tile is developed from native clay shaped under extreme pressure, high fired and exceptionally durable. ROMANY Red Body Tile will withstand an unbelievable amount of punishment *permanently*, and is worthy of careful consideration when planning a school building. Standard sizes are available in 6" x 6", 4 1/4" x 4 1/4", 4 1/4" x 2 1/16", 2 1/16" x 2 1/16" and 3" hexagons, in many attractive colors.

Romany Sloping Window Sill Tile



Some Architects and School Executives prefer a sloping window sill where nothing may be collected—including dust. Here, other areas are used for display. Where janitor service is limited, this sloping treatment for sills has much to offer. ROMANY 6" x 9" bullnose or flat tile may be cut to perfectly connect window sill with wall surface below. Bullnose tile may be either turned into the plaster or wall surface, or into the window, as desired. Here again, the A-4200 cap is of real assistance for both jambs. These units are available in all Buff Body colors.

Romany Vari-Tile



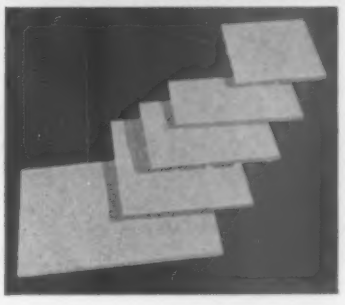
School buildings, because of their size, and because of standardized, repetition of wall surfaces, often present an unwarranted "institutionalized" appearance. Tile walls can be made much less monotonous by the occasional use of ROMANY Vari-Tile. This modern tile offers a new modified fluted surface treatment that invites shades and shadows as opposed to the perfectly flat surface of regular or standard wall tile. It assures definite advantages and can be used judiciously to introduce good design, an absence of "sameness" and a worthwhile psychological appreciation among students and teachers.

Romany Direct Adhesion Base Tile



The ROMANY B-58 5" x 8" Base makes it possible now to repeat the window sill color. Made in all Buff Body colors and has flat back for easy application. Can be installed with adhesive direct to wall block, plaster or wall board. Also may be installed by cement method. Kick proof and mop proof and assures attractive appearance. The ROMANY Thin Lipped base is designed with 3/16" lip, enabling user to match the cove with a Ceramic floor when set with adhesive on composition floors. The use of this base eliminates necessity of having sub floors of different levels.

Romany Scale Advantages



ROMANY Tile is now available in a range of sizes for every type of school building. The unusual length of some school corridors, or large or very limited size of some of the rooms subjected to heavy load impact in use, require careful consideration as to scale. ROMANY flat tile sizes range from 6" x 9" to 4 1/4" x 4 1/4" and offer more than thirty colors in sizes and shapes to fit any area, large or small. Chart showing actual colors gladly furnished upon request or consult our nearest ROMANY representative listed at top of this page for technical advice.

THE MOSAIC TILE COMPANY

General Offices — Zanesville, Ohio

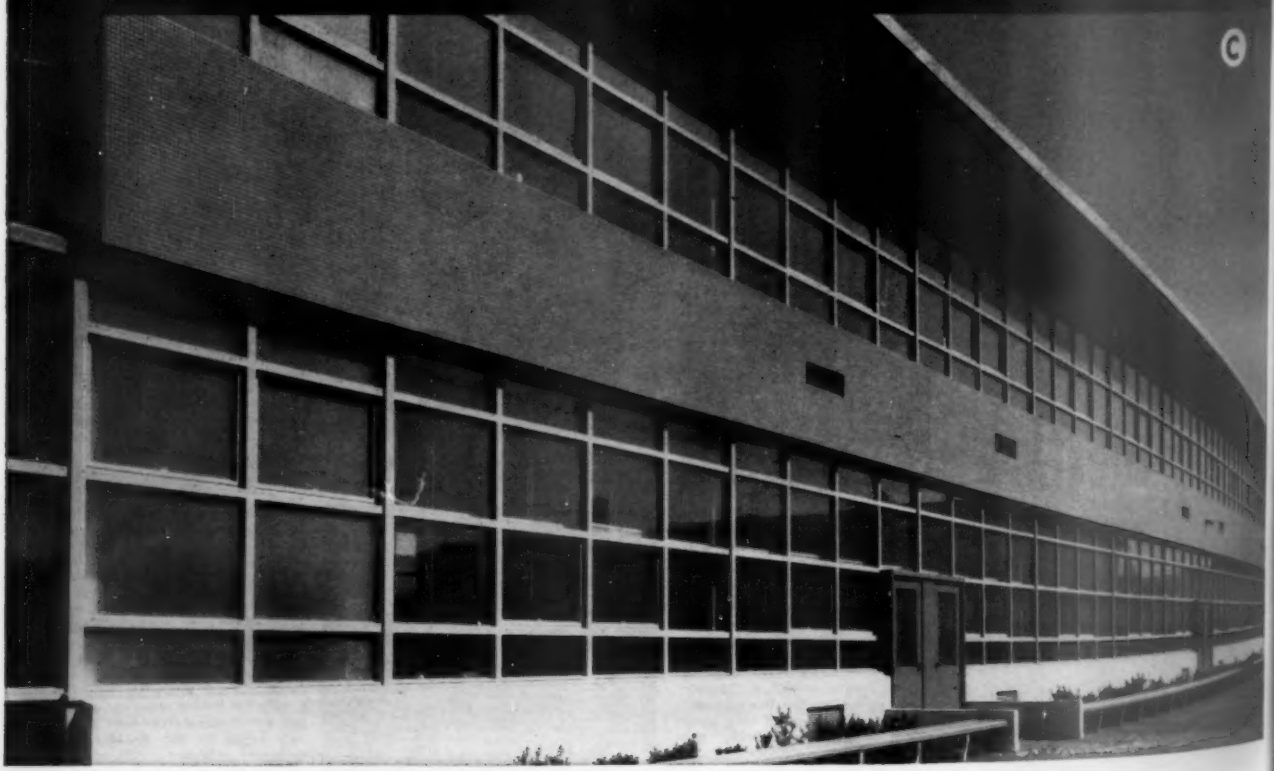
MOSAIC®

Member—Tile Council of America and The Producers' Council, Inc.
Over 5000 Tile Contractors to serve you.





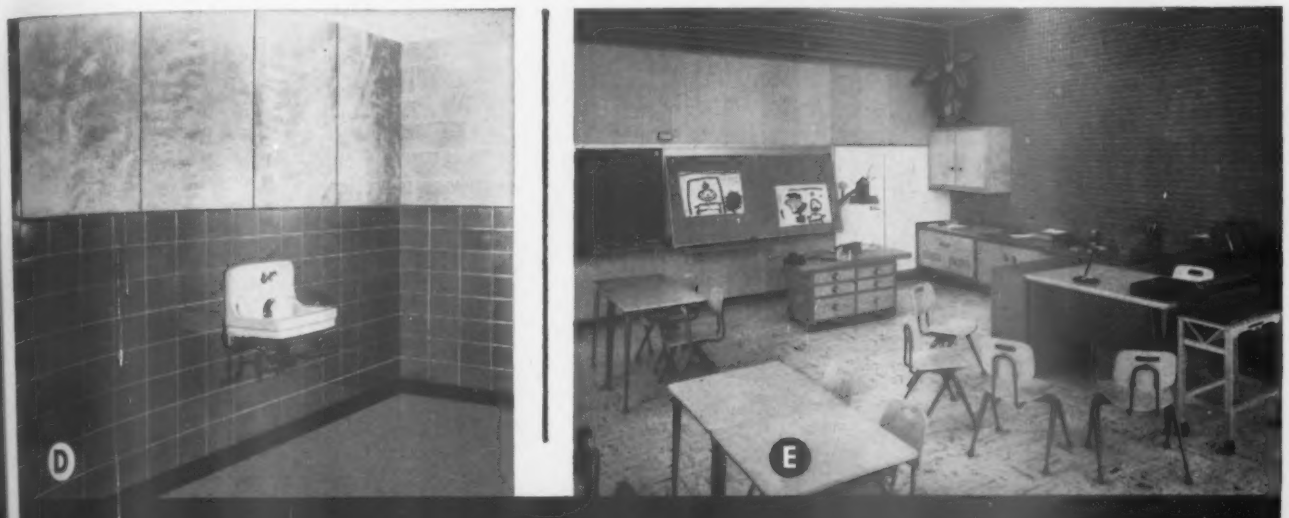
Select the right tile for schools
from the only complete ceramic tile line



THE MOSAIC TILE COMPANY

Factories, Showrooms and Warehouses from Coast to Coast . . .

WAREHOUSES & SHOWROOMS: Atlanta, Baltimore, Boston, Chicago, Dallas, Denver, Detroit, Fresno, Greensboro, Hartford, Hempstead, L. I., N. Y., Hollywood, Little Rock, Miami, Minneapolis, New Orleans, North Hollywood, Philadelphia, Portland, Rosemead, Calif., Salt Lake City, San Francisco, Seattle, Tampa, Washington, D. C., Zanesville. SHOWROOM: New York. REPRESENTATIVES: Buffalo, Cincinnati, Kansas City, Milwaukee, Pittsburgh, St. Louis. FACTORIES: Zanesville & Ironton, Ohio, Matawan, N. J., Little Rock, Ark., Corona & El Segundo, Calif.



MOSAIC...

America's largest ceramic tile manufacturer!

You can place complete confidence in your architect's choice of Mosaic ceramic tile. No other wall and floor material for schools is so permanent, so colorful, so easy and inexpensive to clean. Mosaic ceramic tile is dentproof, stainproof, fireproof . . . stands up under wear better than any other floor and wall material.

Mosaic ceramic tile
for <u>every</u> school building floor and wall . . .

Glazed Wall Tile in Harmonitone Satin-matt and Bright Glazes. The top value in school wall materials, in every desired color and in choice of sizes.

Ceramic Mosaics, small-unit unglazed integral-color porcelain tile for school floors, walls and exteriors. Made in a wide range of rich colors and patterns.

Granitex Mosaics, small-unit unglazed natural clay type, with mottled earth color and native non-slip texture. Provide unlimited design treatment for school floors and walls.

Carlyle Quarry Tile, a product of Mosaic, in larger units for heavy duty floors and walls. Warmly colorful natural clay tile. Several colors suitable for outdoor use.

Faience Tile, hand-crafted by Mosaic, is unmatched for special decorative effects on floors and walls, indoors and out.

A selection of popular Mosaic tile types and colors is readily available from Mosaic Warehouses through Mosaic Service Plan. Ask for Bulletin No. 186.

Illustration notes . . .

A Granitex mosaics, in selected colors, with Everglaze mosaic enrichments, spark-up this school corridor wall. Plant box is surfaced with Mosaic glazed wall tile.

B Mosaic glazed tile walls provide finest sanitation in this school pool. Anti-slip Mosaic Granitex deck assures underfoot safety.

C Spandrel of weatherproof Faience mosaics adds permanent color to this modern school exterior.

D Newest ceramic tile for schools—Mosaic large 9" x 6" x ½" glazed wall tile in all Mosaic Harmonitone Satin-matt and Bright Glaze colors. Competitive in first cost with glazed structural units, more economical through the years. Requires only lowest-cost substructure.

E This Mosaic Granitex tile wall adds interesting contrast to other materials in this classroom. Provides color and cuts maintenance to a minimum.



Mosaic ceramic tile won't burn, fade, scratch, warp, or wear out! Because no other material gives you so many advantages, Mosaic ceramic tile is your best buy for floors and walls in school buildings. Consult your architect, builder or tile contractor—or write Dept. 13-7, The Mosaic Tile Company, Zanesville, Ohio for helpful ceramic tile literature.

THE CELOTEX CORPORATION

120 S. LaSalle St., Chicago 3, Illinois





Keokuk Senior High School, Keokuk, Iowa
Architect: Perkins & Will, Chicago • General Contractor: Lovejoy Construction Co.
Acoustical Contractor: Acousti-Celotex Division, Perma-Stone, Des Moines, Ia.

QUIET goes to school in Keokuk

. . . And another Iowa school scores in the battle against noise, one of learning's most annoying obstacles. Today, thanks to Acousti-Celotex Sound Conditioning, the Keokuk Senior High School enjoys an atmosphere of study-aiding quiet throughout.

Better Lighting, too!—Ably controlling the reverberating spread of noise throughout the building, the Acousti-Celotex ceiling helped permit open corridor-classroom design illustrated, for valuable bilateral natural lighting to all rooms.

Low-Cost Solution—Many of Keokuk's schools are finding Acousti-Celotex Sound Conditioning the economical answer to the noise problem. A sound-absorbing ceiling of this famous cane fiber tile brings *quiet comfort* to every school room where installed. Says John W. Conrad, Keokuk's Superintendent of Building and Grounds: "We have in our school system eight buildings acoustically treated. Our first application was made in 1947, the results of which prompted our Board of Directors to approve acoustical treatment in our yearly plan of modernization."

Simplest Maintenance—Quickly installed, Acousti-Celotex Tile requires no special maintenance, provides excellent sound absorption. Its beautiful surface can be washed *repeatedly* and painted *repeatedly* with no loss of sound-absorbing efficiency. Write today for a Sound Conditioning Survey Chart that will bring you a free analysis of the noise and acoustical problems in your school, plus free booklet, "Sound Conditioning for Schools and Colleges."

TRADE MARK

ACOUSTI-CELOTEX
REGISTERED U. S. PAT. OFF.
Sound Conditioning

Products for Every Sound Conditioning Problem—
The Celotex Corporation, 120 S. La Salle St., Chicago 3, Illinois
In Canada: Dominion Sound Equipments, Ltd., Montreal, Quebec

JOHNS-MANVILLE JM PRODUCTS

JOHNS-MANVILLE

General Offices: 22 E. 40th St., New York 16, N. Y.

Sales Offices

JOHNS-MANVILLE JM PRODUCTS

Albany, N.Y. · Atlanta, Ga. · Baltimore, Md. · Boston, Mass. · Buffalo, N.Y. · Charlotte, N.C. · Chicago, Ill. · Cincinnati, Ohio · Cleveland, Ohio · Dallas, Texas · Des Moines, Iowa · Detroit, Mich. · Hartford, Conn. · Houston, Texas · Indianapolis, Ind. · Kansas City, Mo. · Los Angeles, Calif. · Milwaukee, Wis. · Minneapolis, Minn. · Newark, N.J. · Syracuse, N.Y. · New Orleans, La. · New York, N.Y. · Oakland, Calif. · Philadelphia, Pa. · Pittsburgh, Pa. · Richmond, Va. · Rochester, N.Y. · San Francisco, Calif. · St. Louis, Mo. · Seattle, Wash.

Johns-Manville Offers THE COMPLETE INTERIOR— Walls, Ceilings, Floors

The Johns-Manville System of Unit Construction provides a practical, proved solution to the problem of changing space requirements giving the flexibility necessary in school buildings. To expand or subdivide schoolroom units or to convert a school from one type to another, Johns-Manville offers walls, ceilings and floors as a single unit under a single specification and one manufacturer's responsibility.

J-M Asbestos Movable Walls—These walls are movable, salvageable, easily erected and as easily dismantled and re-located, yet possess the stability and appearance of permanent wall construction. They present a smooth, flush, attractive surface with high resistance to wear and tear.

J-M Acoustical Ceilings—Demountable acoustical units which provide for the installation of fluorescent lighting and the latest types of heating and air-conditioning equipment.

J-M Decorative Floors—J-M Asphalt Tile or J-M Terraflex® Vinyl-Asbestos Tile, resilient floorings of outstanding beauty and durability, permit easy alteration and expansion of floor areas.

These building materials, described fully in the following pages, may be used independently or any two may be combined for a particular service. For complete details, consult your nearest Johns-Manville sales office.

ACOUSTICAL MATERIALS

For 40 years, Johns-Manville has pioneered the development of acoustical materials and their proper application. Trained construction crews, under the supervision of competent acoustical engineers, insure that your project will receive the maximum in noise-quieting benefits.

Sanacoustic Units

Description: J-M Sanacoustic® Ceilings are made up of perforated metal panels with a baked enamel finish backed up with a noncombustible, highly efficient sound-absorbing element. Units are held in place by special tee bars. Sanacoustic is available in two types: "S" and "L." Both have equal acoustical efficiency but offer a choice in appearance.

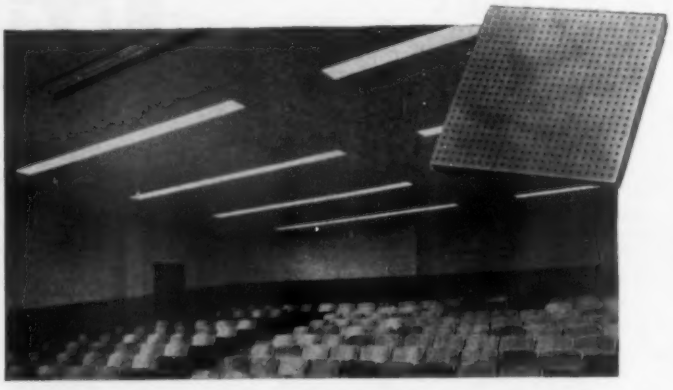
Advantages: Sanacoustic combines exceptionally high sound-absorbing qualities with a high coefficient of light reflection. It will not burn, rot or disintegrate. The baked enamel finish is easy to keep clean, and can be painted and repainted without loss of efficiency.

Application: Sanacoustic may be applied to existing ceilings or hung as a suspended ceiling from furring channels. In either case the units are snapped into tee bars that are mechanically fastened to the surface to be treated. They are easily removed for access to in-the-ceiling services.

Sizes: Both Sanacoustic "S" and "L" are available in size 12" x 24", 2½" thick. Color: White.



The 50-50 Sanacoustic Pattern was designed for installations requiring modest acoustical efficiency at a modest price. This pattern consists of alternate perforated and unperforated Sanacoustic Units.



In this classroom at the State College, Raleigh, North Carolina, the ceiling was made acoustically efficient with J-M Fibretone.

Fibretone Units

Description: J-M Fibretone® consists of 12" square units of sound-absorbing materials in which hundreds of small holes have been drilled. As sound waves strike the acoustical material, the holes act as "noise-traps" where the sound energy is dissipated. Fibretone is available in Uniform Drilled Units or in the new Variety Drilled. The Variety Drilled effect has been created by varying the sizes of the sound-absorbing holes or "noise-traps" drilled into each unit . . . it permits the architect to secure an unusual effect in ceiling design.

Advantages: Fibretone is an efficient acoustical material available at a modest cost. It can be quickly and easily installed over your present ceiling. It is pre-decorated ready for use, but can be painted and repainted when necessary. Also available with a flame-resistant finish.

Application: Fibretone may be installed by means of a metal suspension system; may be cemented to plaster or plasterboard; nailed to 1" x 3" wood furring; or mechanically fastened or cemented to plasterboard.

Sizes: 12" x 12", 12" x 24" in ½" thickness; 12" x 12", 12" x 24", 24" x 24" in ¾" thickness; 12" x 12" in 1" thickness. Color: White.



Transite Panels were selected for this school cafeteria ceiling because they provide a ceiling surface which is flat, level and unusually attractive.

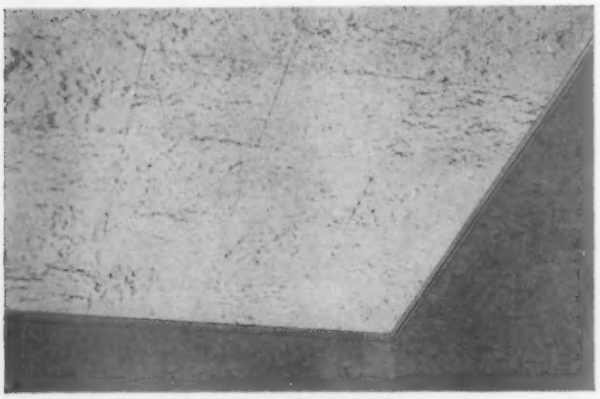
Transite Acoustical Panels

Description: J-M Transite® Acoustical Panels consist of a perforated asbestos-cement Transite facing, 3/16" thick, used in conjunction with a sound-absorbing element. The sound-absorbing element is available in a number of thicknesses and types depending on the acoustical requirements. These panels are available in natural gray with beveled or square edges and in factory-applied standard white finish with beveled edges only. The appearance of an unbroken perforated area can be obtained with the unbeveled Panels.

Advantages: Transite Acoustical Panels are particularly resistant to fire and moisture. They are ideal for use in school kitchens, cafeterias, gymnasiums, laboratories and swimming pools and are especially adapted for use in broadcasting studios, music rooms, and auditoriums. They are easy to clean and may be repainted without loss of acoustical efficiency.

Application: The sound-absorbing element in Transite Panels is installed between furring strips (wood or special metal) to which the Transite facing is fastened by nails and screws.

Sizes: 23⅞" x 23⅞", 24" x 24", 23⅞" x 47¾" and 24" x 48".



For many locations in schools and universities, such as conference rooms, executive offices, dining rooms, etc., the textured finish of Permacoustic is considered architecturally desirable.

Permacoustic Tile

Description: J-M Permacoustic® Tile is made of incombustible rock wool fibres held together with a binder in monolithic construction. Standard units are made with either square or beveled edges. Permacoustic is available with either a textured or fissured surface.

Advantages: J-M Permacoustic Tile provides unusual architectural beauty with maximum acoustical efficiency and fire safety. Fireproof, it meets all building code fire-safety requirements. Its random-textured finishes increase its noise-reduction qualities and provide design and decorative interest.

Application: Permacoustic may be installed by means of application with an adhesive to existing slabs or ceilings or by means of a metal suspension system engaged into kerfed edges of the units.

Sizes: 12" x 12", 6" x 12" and 12" x 24" in thicknesses of ¾" and ⅞", either fissured or textured. Color: White.

DECORATIVE FLOORINGS



The variety of colors and patterns of J-M Asphalt Tile make it suitable for school libraries, class rooms, corridors, auditoriums, etc.



Quiet under foot, J-M Terraflex is a fitting floor for this library. This restful flooring combines light reflection with quiet dignity.

J-M Asphalt Tile

Over 20 years of experience and use have established J-M Asphalt Tile as the standard for a durable, colorful, low-cost flooring. Its inviting, attractive appearance, modest cost and low upkeep make it ideal for all types of commercial and institutional buildings.

Long-Wearing, Durable: Due to its high asbestos fibre content, J-M Asphalt Tile is resistant to fire, indentation, moisture and abrasion . . . it cannot rot or dry out, and maintains its durability and toughness year after year.

Low Cost, Minimum Upkeep: The first cost of J-M Asphalt Tile is lower than that of other types of resilient floorings of the same thickness. Odorless and non-absorbent, it will not originate dust and is easily kept clean, attractive and sanitary.

Inviting and Attractive: J-M Asphalt Tile is available in a wide range of plain and marbleized colors from which the architect can develop appropriate patterns and color combinations that lend themselves to the design of any school interior.

Resilient Underfoot: J-M Asphalt Tile makes for quiet, comfortable foot traffic. Easy to walk and stand on, it is a safe floor because of its skid-resistant characteristics.

J-M Terraflex

Terraflex® is a vinyl plastic and asbestos floor tile pioneered and developed by Johns-Manville. It is particularly suited to school floor service requirements as it provides maximum service with a minimum of maintenance expense.

Long-Wearing: Terraflex far outwears any other type of resilient flooring of equal thickness. It is exceptionally tough and resistant to traffic, yet is unusually resilient and quiet underfoot.

Low Maintenance: Terraflex has a non-porous surface that dirt can't penetrate, assuring a high degree of cleanliness with a minimum of care. It requires no hard scrubbing . . . a damp mopping usually keeps it shining clean.

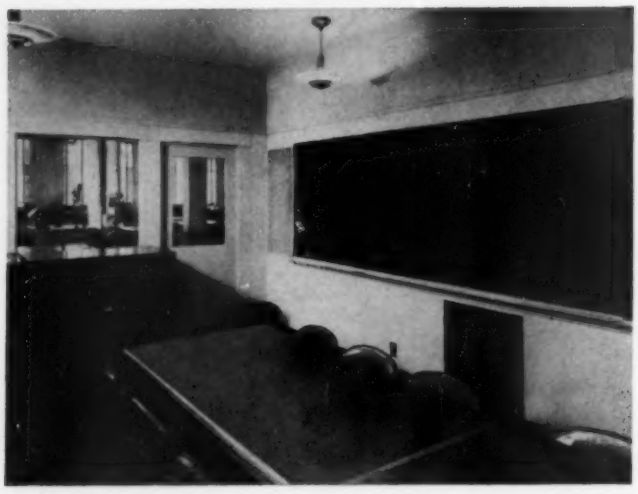
Beauty of Color and Design: Terraflex is available in a wide variety of clear, vivid, warm colors which keep their newness for the lifetime of the floor as the color goes all the way through each tile.

Unaffected by Strong Soaps: Terraflex defies grease, oil, strong soaps and mild acids. It resists moisture and is ideal for below-grade and on-grade installations.

SIZES, WEIGHTS AND THICKNESSES OF J-M FLOORINGS

Type	Standard Sizes, in.	Thickness, in.	Weight, lb per sq ft
Asphalt Tile	9 x 9	1/8	1.2
		3/16	1.8
Terraflex	9 x 9	1/16	2/3
		1/8	1.3

ASBESTOS MOVABLE WALLS



In this classroom at a western university, blackboards are an integral part of the movable partition. Cork boards, natural slate chalk boards, etc., are easily incorporated into Transite Wall construction.



Transite Walls are ideal for industrial and household arts areas. Hard to mar, sturdy, and permanent, they can be dismantled and relocated to meet changing needs at a minimum of time and expense.

Johns-Manville Asbestos Movable Walls provide the ideal solution to the problem of meeting the changing needs of classroom construction. They serve as attractive, permanent partitions, yet can be dismantled and re-erected without loss of material. Surfaces are flush and projection-free. To meet varied architectural and budget requirements, they are made in four distinct types:

J-M Class A Walls A non-combustible moderate-priced movable wall construction composed of an all-mineral core with sturdy asbestos-cement surfaces and steel trim. The finish is a tough hard film which is mar and scratch-resistant, rejects stain and soil, can be easily washed or even scrubbed if necessary. They have a textured stipple finish in restful colors.

J-M Universal Walls A moderate-priced wall construction widely accepted as a general use partitioning. Finished walls consist of a sealed core faced on both sides with asbestos-cement sheets and furnished as complete wall sections 1¾" in thickness. Available in a textured stipple finish in standard colors or in natural gray.

J-M Imperial Transitone® Walls A fireproof movable wall construction with integrally colored asbestos panels. The color cannot chip or wear off because it goes all the way through each panel. Light in weight, rugged and sturdy, Transitone is available in two attractive colors—light green and light tan.

J-M Imperial Transite® Walls Fireproof, strong, long-wearing asbestos panels in natural light-gray color which may be waxed, decorated or left as is. Both Transite and Transitone employ patented steel studs on which the panels are hung with metal fasteners. Finished walls provide a rigid, double-faced partition approximately 4" thick.

For complete details on J-M Asbestos Movable Walls, consult your nearest Johns-Manville sales office.

Built-up Roofing

Bonded for 10 years, the J-M Flexstone Built-Up Roof on the Poly Prep Country Day School, Brooklyn, N.Y. (pictured at right) was still going strong after 25 years of service! It is typical of the service provided by these better built-up roofs.

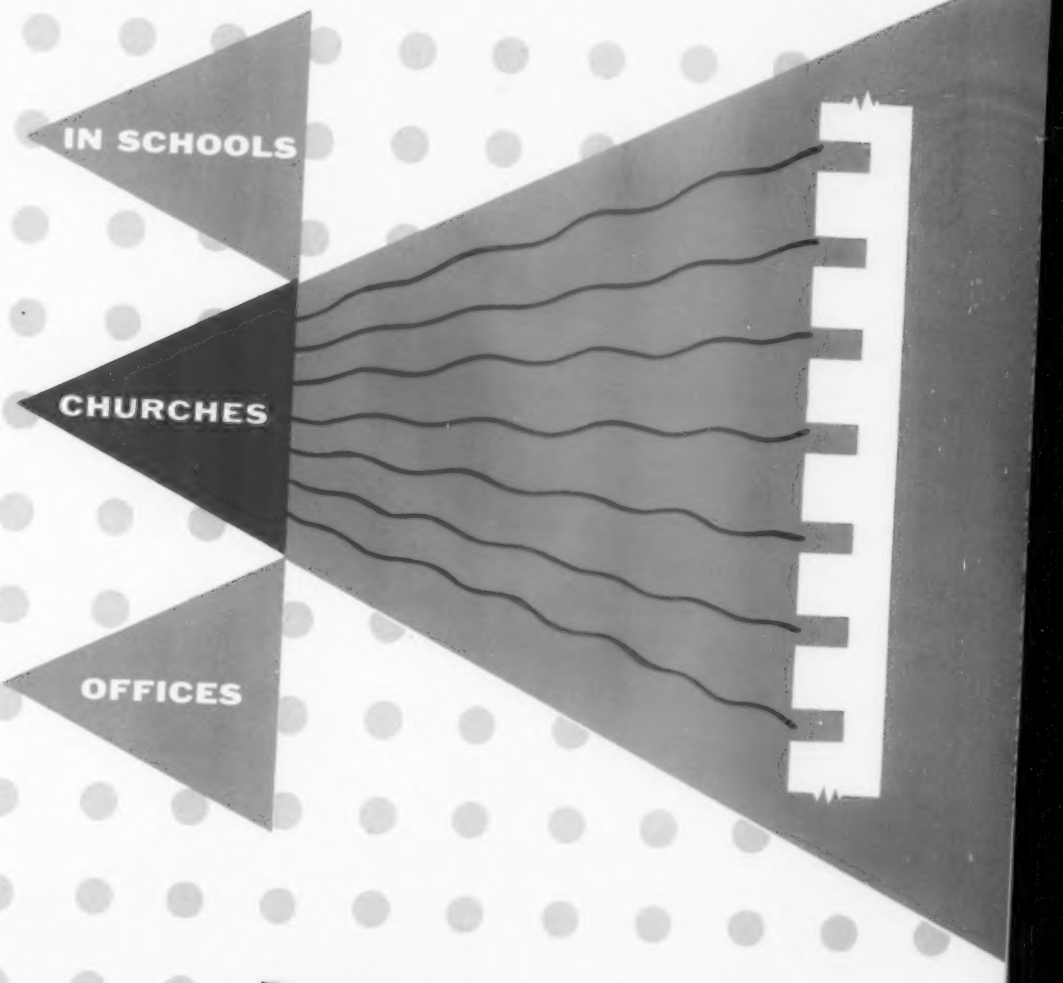
These roofs will not support combustion, are rot-proof and durable, and need no periodic coating. Because they are smooth-surfaced, there is no excess weight of slag or gravel. Furthermore, maintenance costs are comparatively low. For complete details, write Johns-Manville.



B-4/DA

FIR-TEX

PERFORATED ACOUSTICAL TILE



AND WHEREVER THE
ONTROL OF SOUND
S A FACTOR

FIR-TEX PERFORATED ACOUSTICAL TILE

ACOUSTICAL CORRECTION

Unwanted sound within a room such as the chatter of typewriters, the rattle of dishes, the noise of strident voices can be controlled or modified through the medium of acoustical (sound absorptive) materials such as Fir-Tex Perforated Acoustical Tile. Fir-Tex Perforated Acoustical Tile is made of strong, tough wood fibers, felted together and pressed into a rigid tile in such a way as to preserve the natural air cells within the fibers and add millions more sound-absorbing cells between fibers. Exposed surface is then perforated in a rectangular pattern. Soaks up noise like a sponge takes water. It is a finer material for sound control in hospitals, churches, classrooms, libraries, gyms, auditoriums, etc. Engineered for quick, low-cost installation and maintenance.

• • •



THICKNESSES: ½", ⅝", ¾", 1".

STANDARD SIZES: 12" x 12", 12" x 24" (scored to simulate 12" x 12" or unscored). Available in all thicknesses.

STANDARD JOINTS: All thicknesses available in butt joint. ½" and 1" also available in Firlok joint. ⅝", ¾" and 1" also available kerfed for splines or kerfed and cut back for mechanical suspension.

FINISHES: Standard washable Whitekote. Also available with a special factory applied washable flame resistant coating complying with Fed. Spec. SS-A-118a Class C.

Sound Absorption: Fir-Tex Perforated Acoustical Tile is scientifically engineered to absorb reverberations and take the shock or impact out of noise. Fir-Tex Tile is one of the outstanding acoustical tiles, as shown by the tests tabulated below:

Thick	Mount	125	250	500	1000	2000	4000	NRC	Unit Size Tested	Light Reflection	Weight Lbs. per Sq. Ft.	Test No.
½"	No. 1	.03	.15	.64	.83	.79	.77	.60	12" x 12"	.76	0.71	A52-34
½"	No. 2	.08	.42	.57	.75	.72	.75	.60	12" x 12"	.76	0.71	A52-342
⅝"	No. 1	.06	.17	.69	.87	.78	.65	.65	12" x 12"	.74	0.88	A52-34
⅝"	No. 2	.10	.49	.63	.84	.80	.76	.70	12" x 12"	.74	0.88	A52-344
¾"	No. 1	.16	.27	.72	.83	.78	.63	.65	12" x 12"	.77	1.16	A54-20
¾"	No. 2	.32	.59	.56	.82	.76	.65	.70	12" x 12"	.77	1.16	A54-20
¾"	No. 7	.50	.37	.54	.84	.83	.74	.65	12" x 12"	.77	1.16	A54-19
1"	No. 1	.06	.34	.81	.93	.77	.63	.70	12" x 12"	.72	1.54	A52-35
1"	No. 2	.22	.61	.70	.86	.74	.57	.75	12" x 12"	.72	1.54	A52-35
1"	No. 7	.48	.47	.73	.84	.79	.60	.70	12" x 12"	.72	1.54	A52-34



NEW CASUAL PATTERN FIR-TEX PERFORATED TILE

The perforations in this new Fir-Tex product are pleasingly disarranged so as to provide a tile distinctive in appearance. The entire room has character with no apparent pattern for distraction. The holes all are the same size with the disarrangements minimizing the joints. Fir-Tex Casual pattern perforated tile is available only in 12″ x 12″ in all thicknesses and the joints for all thicknesses as on Standard Tile.

D&R ACOUSTICAL METAL PAN

D & R Perforated Metal Pan provides a complete ceiling treatment, eliminating the need for plastering, painting, or other ceiling finish. It is installed by mechanical suspension thus making easy:

1. The concealment of unsightly wiring or piping.
2. Removal of individual units for purpose of inspection.
3. Replacement because of the simple snap-on-installation.

D & R Metal Pan is made of 26-gauge cold rolled steel, precision perforated with 0.109″ diameter holes, 1013 per square foot, with two coats baked on white enamel. The perforations permit the unwanted sound to penetrate to the 1¼″ thick mineral wool pad, which rests on a metal grid within the pan.

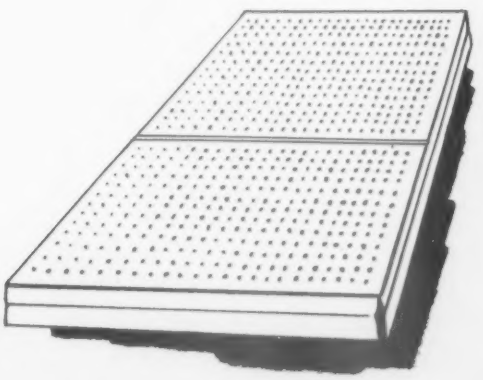
D & R Metal Pan is easy to clean and easy to keep clean. Even in places of unusual soil hazard, frequent washing with soap and water will keep it fresh and clean.

D & R Metal Pan rates as incombustible under Federal Specifications SS-A-118a and will pass any fire ordinance specifying an incombustible acoustical material.

SOUND ABSORPTION COEFFICIENTS OF D & R ACOUSTICAL METAL PAN

Thick	Mount	125	250	500	1000	2000	4000	NRC	Unit Size Tested	Weight Lbs. per Sq. Ft. Light Refl.	Test No.
2½″	3	.45	.78	.86	.95	.75	.61	.85	12″x24″	.73	54-221





EAST OF THE ROCKIES

DANT & RUSSELL SALES CO.
CHICAGO, ILLINOIS
8 SO. MICHIGAN AVE.



DANT & RUSSELL, INC
EXCLUSIVE DISTRIBUTOR
GENERAL SALES OFFICES
PORTLAND, OREGON

WEST OF THE ROCKIES

DANT & RUSSELL SALES CO.
PORTLAND, OREGON
1320 S. W. BROADWAY

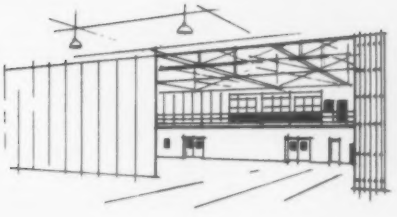
SAN FRANCISCO, CALIF.
214 FRONT STREET

LOS ANGELES, CALIF.
812 EAST 59th STREET

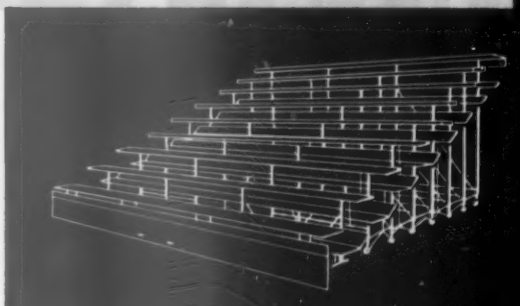
B5
Ho

designed to give you...

MORE SPACE AT LESS COST!



FOLDING PARTITIONS



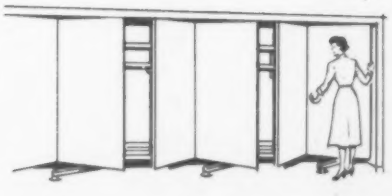
FOLDING GYMNASIUM SEATING



LDING STAGES

Brunswick Horn

- FOLDING STAGES
- FOLDING WARDROBES
- FOLDING PARTITIONS
- FOLDING GYMNASIUM SEATING



FOLDING WARDROBES



THE BRUNSWICK-BALKE-COLLENDER COMPANY

MARION, VIRGINIA

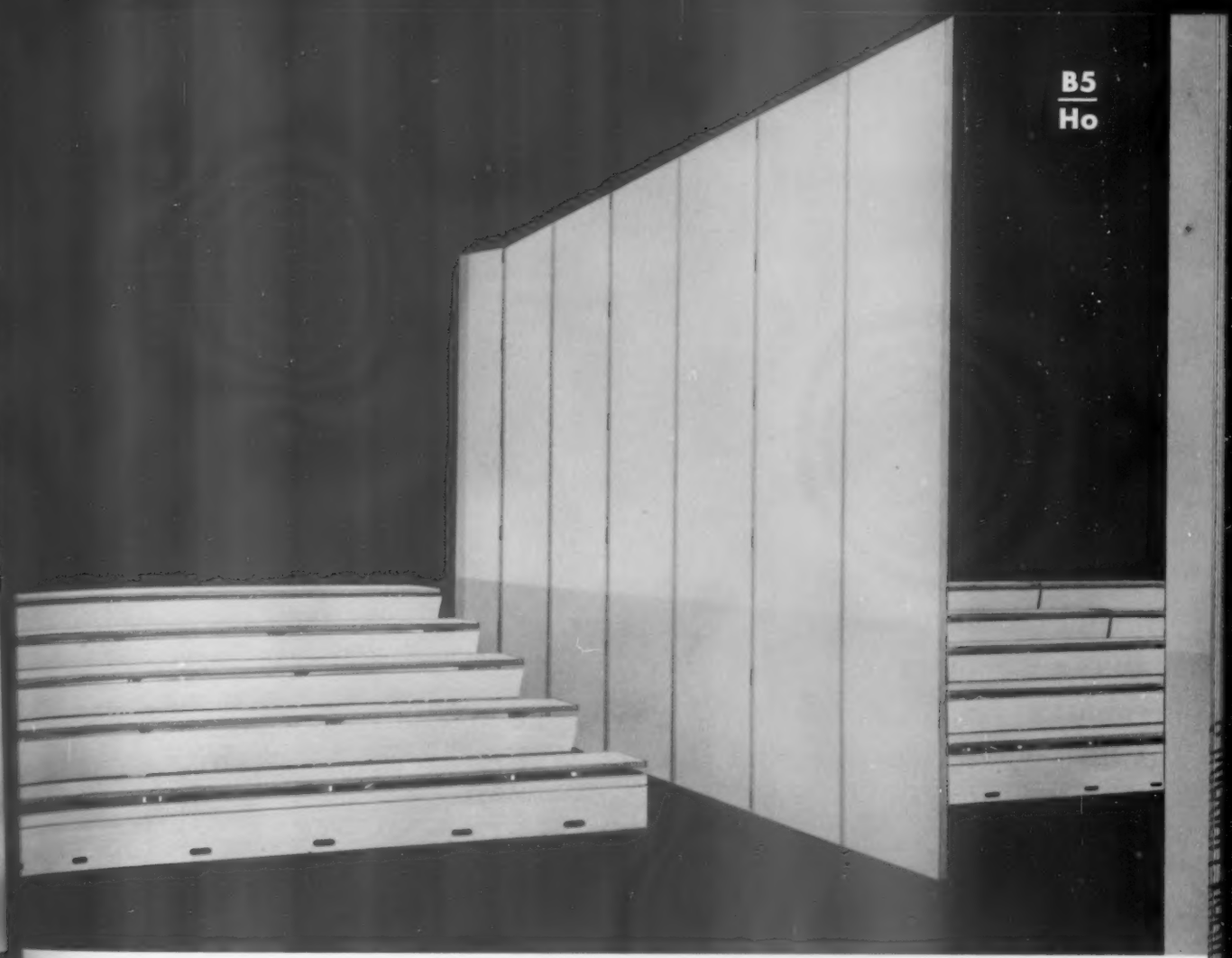
Triple Your Gym Facilities with Brunswick-Horn Folding Partitions and Folding Gymnasium Seating



BRUNSWICK-HORN FOLDING PARTITIONS give you the maximum use from your gym space at a minimum of investment! Instead of building separate gyms, you build only one, equipping it with a Brunswick-Horn Folding Partition. Close the partition and you have *two separate* gyms for boys' and girls' classes . . . open the partition and you have a large exhibition gym–*three* gyms from the space of *one!* You get more use from classroom space too, with Brunswick-Horn Folding Partitions. Use them in your cafeteria, library, multi-purpose rooms–wherever you want to divide activities at will! Whether you specify automatic electric, mechanical, or manual operation, every partition is custom-engineered to your specifications . . custom-installed by factory mechanics to assure the utmost in service and performance.

BRUNSWICK-HORN FOLDING GYMNASIUM SEATING are perfect partners to Brunswick-Horn Folding Partitions for getting the most from your gym space. Close the partition and fold the seating unit against the wall (you'll be surprised how little space they use) and you have plenty of room in each practice gym. Open the partition and extend the seating unit and you have an exhibition gym with plenty of revenue-producing seating. The full chair height of the gymnasium seating provides maximum seating comfort to spectators, and there's plenty of leg room so that "late arrivals" can slip in easily. Each row of the seating unit locks automatically when unfolded, assuring the utmost in safety. When folded the seats provide safety too, for they present a smooth, sloping surface, free of sharp or protruding edges.





Get the Most Out of Your Rooms with Brunswick-Horn Folding Stages and Folding Wardrobes!

BRUNSWICK-HORN FOLDING STAGES are real work-savers! With little effort any room can become a theater within minutes. You simply roll a Brunswick-Horn Folding Stage into position, secure it in place by a few quick turns of the rubber-tipped floor stops, and it's ready for use. When finished, release the floor stops, fold the stage, and roll it away—freeing the floor space for other classroom uses. No storage problem either, for the stage folds into a compact bundle that requires little space. Its sturdy steel under-structure and floor of select, vertical-grained fir makes the Brunswick-Horn Stage a strong, durable unit that will withstand the hardest use. Your choice of two heights and a variety of standard sizes that will solve any problem.

BRUNSWICK-HORN FOLDING WARDROBES are designed to meet the modern trend toward functional classroom planning. Open the doors and you have generous wardrobe and storage space . . . close them and you have a chalkboard or bulletin board. Quiet, effortless operation is yours for many years, for Brunswick-Horn Wardrobes feature operating hardware of new, advanced design. Doors keep in perfect alignment because they're adjustable in all directions, may be latched open or closed to prevent unauthorized movement. Brunswick-Horn offers you three types of open-close operation, each with doors that move singly or all together. The most complete line of classroom wardrobes available. And each unit is designed and constructed to your requirements!

For Complete Information on—

- **GYMNASIUM SEATING**
- **FOLDING PARTITIONS**
- **FOLDING STAGES**
- **FOLDING WARDROBES**



Write—

to Dept. SU, The Brunswick-Balke-Collender Company, Marion, Virginia

Or Use The American School & University Reply Cards

Your request will receive prompt attention at no cost and without obligation.

Brunswick Horn

FOLDING GYMNASIUM SEATING

From the Largest to the Smallest Installation... Custom Service!



The World's Largest Installation of Folding Gymnasium Seating... Northside Gymnasium, Elkhart, Indiana.



Brunswick-Horn Seating Installation in Goardman Elementary School, Goardman, Ohio... tailored to fit its needs!

Any school's gymnasium seating problem... whether it be as tremendous in scope as the Brunswick-Horn world's largest installation at Elkhart or as small as the Goardman installation, receives the same high quality of construction, service and engineering design.

Every seating unit installed by Brunswick-Horn is carefully tested to insure consistent safe operation and performance. From start to finish... every step of the way... the Seating Unit is subjected to exacting requirements, the complete supervision of Brunswick-Horn gymnasium seating experts. No matter how large or small your seating requirements may be, Brunswick-Horn Gymnasium Seating brings maximum revenue and seating capacity to *your* school.

Brunswick Horn

THE BRUNSWICK-BALKE-COLLENDER COMPANY

MARION, VIRGINIA

Form No. 255-9

PRINTED IN U.S.A.

MILLS Movable METAL WALLS

B-5/Mi

provide *Space Control* for school buildings . . . keep them adaptable to changing requirements

No matter how perfectly it fulfills *present* requirements, a school whose interiors are *frozen* by space-locking immovable walls has little hope of meeting future educational needs efficiently. The school will begin to lose its efficiency just as soon as changes in enrollment and curricula occur.

But school space need not be frozen. Mills Movable Walls give you *Space Control* by keeping your space always adaptable to changing requirements. These walls can be rearranged to fit new layouts—quickly, easily and at very low cost—whenever the need occurs.

Mills Walls combine this efficient adaptability with dignified architectural design and structural stability. Made of incombustible materials, they are fully insulated and soundproofed and have easily accessible lay-in raceways for electrical wiring and controls. Their baked-on enamel finishes are specially treated to eliminate all harsh light reflection and they require no maintenance except occasional washing to keep them always at their efficient best.



Oberlin College—Mills Walls can be completely rearranged overnight or during a week end without interrupting normal usage of space.



Kent State University—the Mills Walls dividing these rooms can be removed in a matter of minutes, without dust, debris, commotion or interruption of normal routine.



Emory University—a dignified yet adaptable administrative office. The walls throughout this new research laboratory building are Mills Movable Metal Walls.

SOME RECENT INSTALLATIONS:

- **Mayfield High School, Mayfield Heights, Ohio**
- **Madisonville High School, Cincinnati, Ohio**
- **Erlanger Elsmere High School, Erlanger, Kentucky**
- **Alabama State College, Montgomery, Alabama**
- **Rogers High School, Grand Rapids, Michigan**
- **Southwestern Junior High School, San Diego, California**
- **Ohio State University, Columbus, Ohio**
- **Saugus High School, Saugus, Massachusetts**
- **State University of Iowa, Iowa City, Iowa**

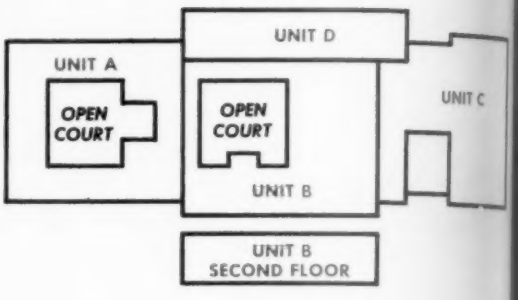


Edsel Ford Senior High School, Dearborn, Michigan

Mills Movable Metal Walls provide Space Control in this typically modern building.

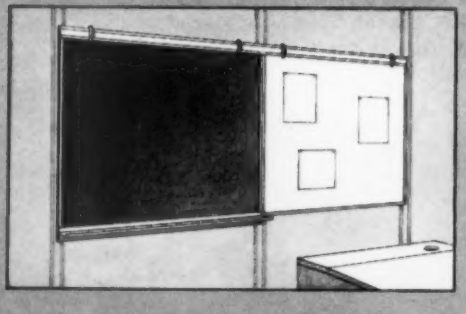
How Edsel Ford Senior High School achieves *Space Control* with Mills Movable Walls

This functional new high school has *mobilized* its efficient space layouts to meet future changes in space requirements—changes which are inevitable because of today's surging enrollments, shifting curricular patterns and constant advancements in educational techniques and equipment. To make possible the fullest use of space years from now *as well as today*, Edsel Ford Senior High uses Mills Movable Walls to form class rooms, conference and activity rooms, laboratories and technical work shops. These Walls can be removed and reerected to fit new layouts with a minimum of cost and time, whenever the need for rearrangement occurs.



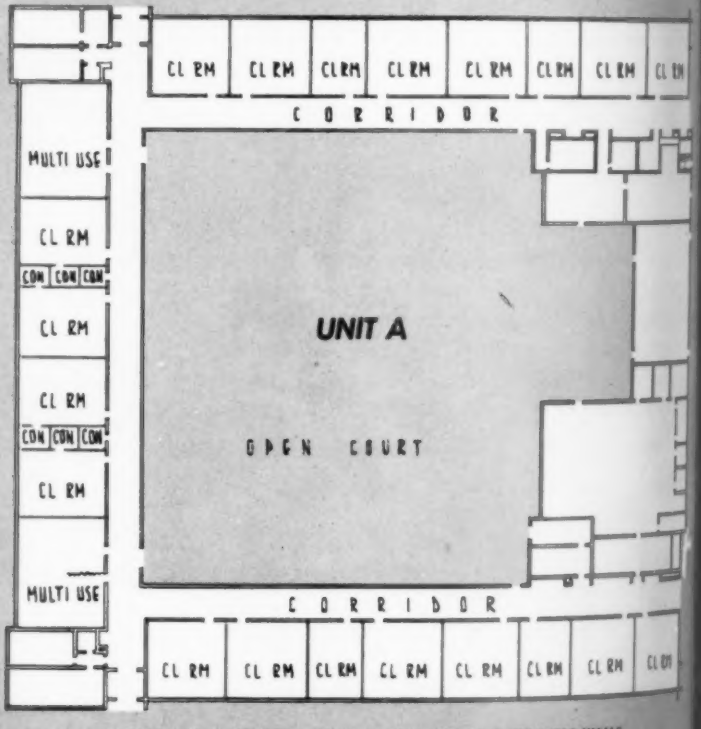
In Units A, B and D of Edsel Ford Senior High School the exterior walls and corridor walls are immovable. The dividing walls shown in blue in the drawings at right and on the opposite page are Mills Movable Metal Walls. This arrangement permits almost unlimited adjustability of the space subdivisions, balancing space utilization with variable space requirements. This use of Mills Movable Walls achieves practical *Space Control* of these areas.

- A 4-foot module is used for spacing window mullions permitting dividing walls to be moved in either direction in multiples of 4-feet, to enlarge or reduce class room sizes as required.
- Conference rooms, work rooms, etc., can easily be changed in size or entirely relocated if necessary for the most efficient utilization of space.
- Chalk boards and tack boards are easily installed on Mills Movable Walls and are just as easily moved when the walls are

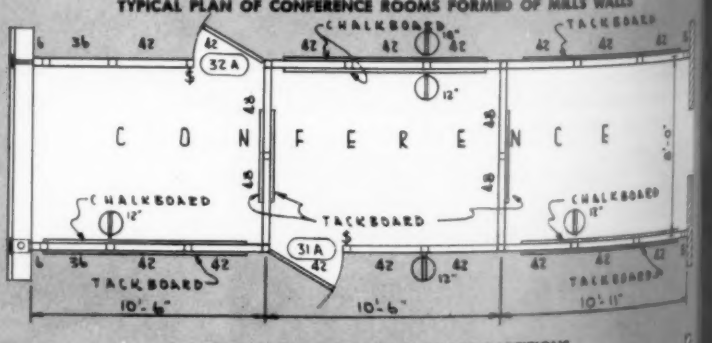


rearranged. Panels can not be marred or damaged because the boards are fastened to the caps of panel connections.

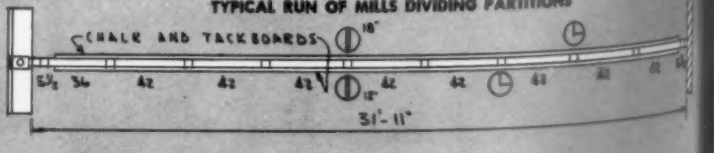
BLUE LINES INDICATE MILLS MOVABLE METAL WALLS



TYPICAL PLAN OF CONFERENCE ROOMS FORMED OF MILLS WALLS



TYPICAL RUN OF MILLS DIVIDING PARTITIONS

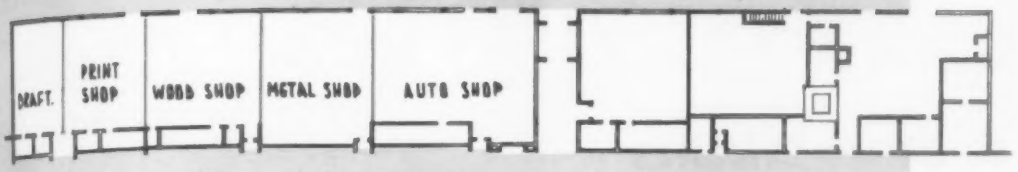


LEGEND

duplex outlet clock outlet switch

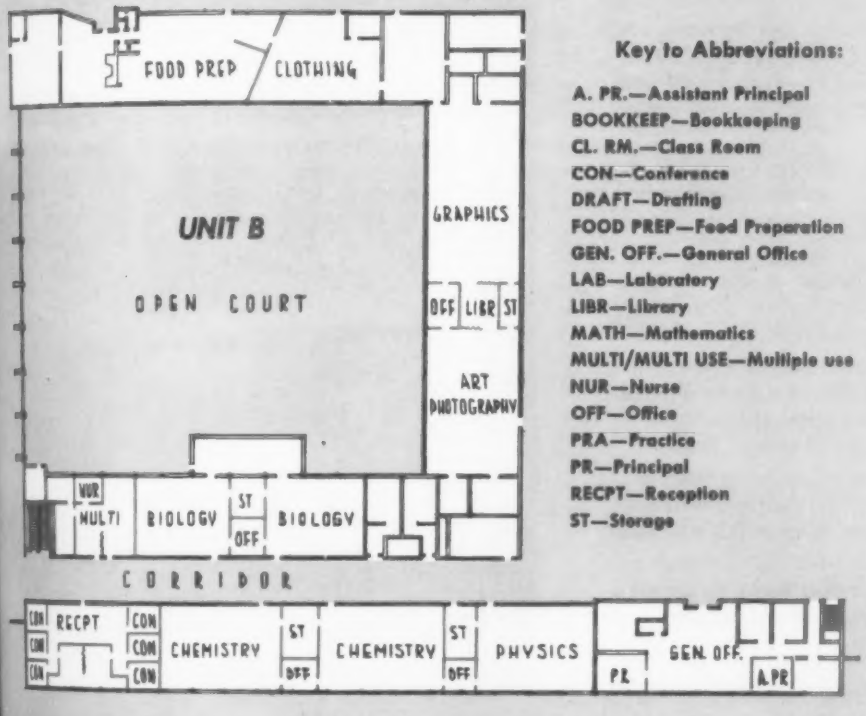
BLUE LINES INDICATE MILLS MOVABLE METAL WALLS

UNIT D



B-5/Mi

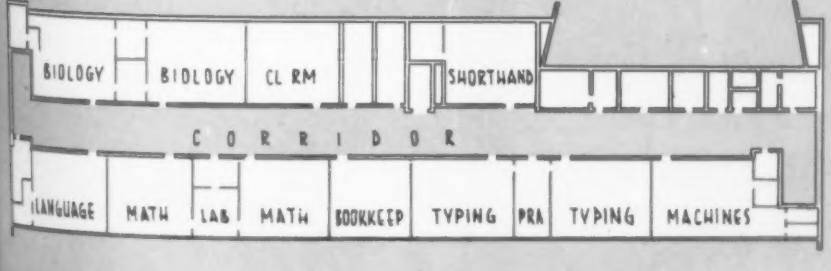
Unit D is entirely devoted to industrial arts and technical training work shops subdivided by Mills Movable Metal Walls. Space can be easily rearranged to accommodate inevitable changes in the enrollments and equipment requirements of the various technical courses.



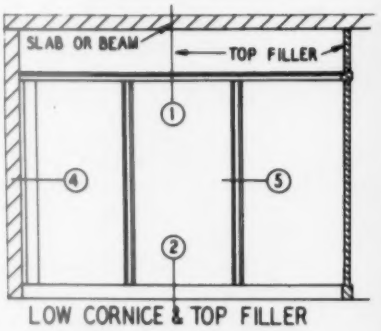
Key to Abbreviations:

A. PR.—Assistant Principal
BOOKKEEP—Bookkeeping
CL. RM.—Class Room
CON—Conference
DRAFT—Drafting
FOOD PREP—Food Preparation
GEN. OFF.—General Office
LAB—Laboratory
LIBR—Library
MATH—Mathematics
MULTI/MULTI USE—Multiple use
NUR—Nurse
OFF—Office
PRA—Practice
PR—Principal
RECPT—Reception
ST—Storage

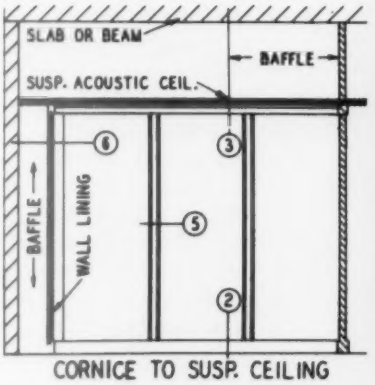
UNIT B Second Floor



The second floor of Unit B contains a number of business-machine class rooms. The Mills Movable Walls which subdivide this area provide such adequate sound resistance that language and mathematics classrooms are located immediately adjacent to the business-machine classes.



LOW CORNICE & TOP FILLER



CORNICE TO SUSP. CEILING

Mills Movable Metal Walls are made to meet the most rigid soundproofing requirements, providing sound transmission loss of 36 to 40 decibels as required. Where suspended ceilings are used, special precautions should be taken since such ceilings are ineffective sound barriers. As shown in drawings above, baffles should be installed tightly between the bottom of the slab and the top of the ceiling, above each run of movable partitions, to assure adequate sound control.

This book shows you how to get Space Control. The Mills Movable Wall Catalog is a practical 68-page workbook of detailed information, specifications, ¼" scale drawings and illustrations of all types of Mills Movable Walls and accessories.

Complete catalog in Sweet's Architectural File



THE MILLS COMPANY

986 Wayside Road, Cleveland 10, Ohio

MILLS METAL COMPARTMENTS

The selection of toilet compartments, shower units and dressing rooms for the modern school building is a matter of no small importance. These facilities must reflect a sense of utmost orderliness, cleanliness, dignity and good taste. Mills Toilet Compartments are designed and built with these considerations in mind.

Four different types of Mills Toilet Compartments are available, all combining superior design and appearance with economy and low maintenance requirements. All can be quickly and easily installed, quickly and easily cleaned.

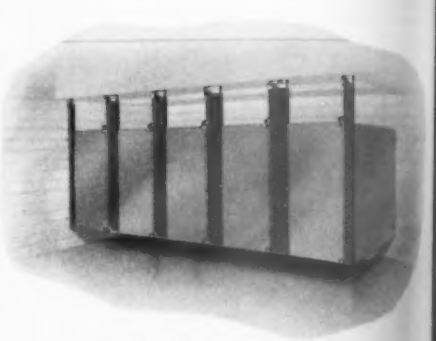
MARBLMETAL—*Ceiling Hung.* Hung rigidly from structural supports at the ceiling, with no floor contact, these compartments provide the utmost in sanitation and easy cleaning.

MARBLMETAL—*Floor Braced.* Similar in construction to Ceiling Hung compartments but bolted securely to the floor with a special anchoring and leveling device.

SENTINEL. Mills Sentinel Compartments have the same general specifications as Mills Marblmetal Floor Braced Compartments, except that fronts extend approximately 12″ above doortops to a continuous overhead brace.

METAL FLUSH. Mills Metal Flush Compartments, are characterized by their 1″ thick slab-like panels and doors, fully insulated, with sturdy headrail construction assuring rigidity.

Mills All-Metal Shower and Dressing Rooms, Shower Units and Metal Hospital Cubicles are also available.



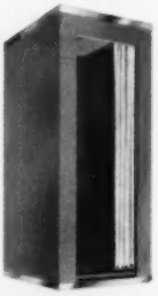
MARBLMETAL—Ceiling Hung



MARBLMETAL—Floor Braced



SENTINEL



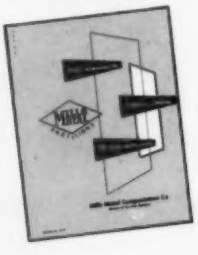
SHOWER UNITS



SHOWER & DRESSING ROOMS



METAL FLUSH



The 20-page Mills Metal Compartment Catalog gives complete specifications, technical details and color samples on Mills Compartments.

Complete catalog in Sweet's Architectural File

MILLS METAL COMPARTMENT CO.

Division of The Mills Company

986 Wayside Road • Cleveland 10, Ohio

MARTIN-PARRY CORPORATION

Box 964, Toledo, Ohio



Metlwals afford necessary flexibility to meet changing educational needs of schools. Maintenance men of Chippewa Junior High School, Port Huron, Michigan, moved partition, made one room out of two, without outside help, writes Charles M. Valentine, Architect.



Chalkboard is flush-mounted in Metlwal partition in Rangely, Colorado, High School. Inset is close-up of chalkrail. Note electrical outlet above chalkboard. Standard outlets can be located anywhere in Metlwal partitions. Wiring's easy, quickly accessible.

metlwal . . .

the truly modern way
to divide school space and save money!

Adaptability, flexibility and little or no maintenance cost — all important budget factors in the educational field — are among the reasons why increasing numbers of architects are specifying M/P METLWAL Movable Partitions and Paneling in school construction.

Not only are METLWALS widely chosen as original equipment in new classroom construction and in administrative areas, but they are also used in existing schools to divide space and panel walls.

With METLWALS, it's possible to divide floor space in any way desired and to cover interior walls — using *only a few standardized parts.* Installation is fast, clean, simple and *unbelievably low in cost.* These beautiful walls, which come in a wide range of distinctive decorator colors, are completely permanent in appearance, yet *easily movable without waste* when a floor plan must be changed.

Martin-Parry service is nationwide. M/P distributors, located in principal cities, provide warehousing, engineering and erection servce.

OUR LATEST CATALOG WILL BE SENT YOU PROMPTLY, ON REQUEST

MARTIN-PARRY CORPORATION

75 years of service

MARTIN PARRY MP PRODUCTS

BOX 964 • TOLEDO, OHIO



and now . . . metlwal jr!

Here's a new kind of *portable* metal partition that's as easy to move about as ordinary office furniture. Installation's so simple that any kind of space arrangement can be created or changed almost instantly. It's a "do-it-yourself" job that in practically all cases requires only one tool — a screw-driver!

JOHN T. FAIRHURST CO., INC.

45 West 45th Street, New York 36, N. Y., Dept. U

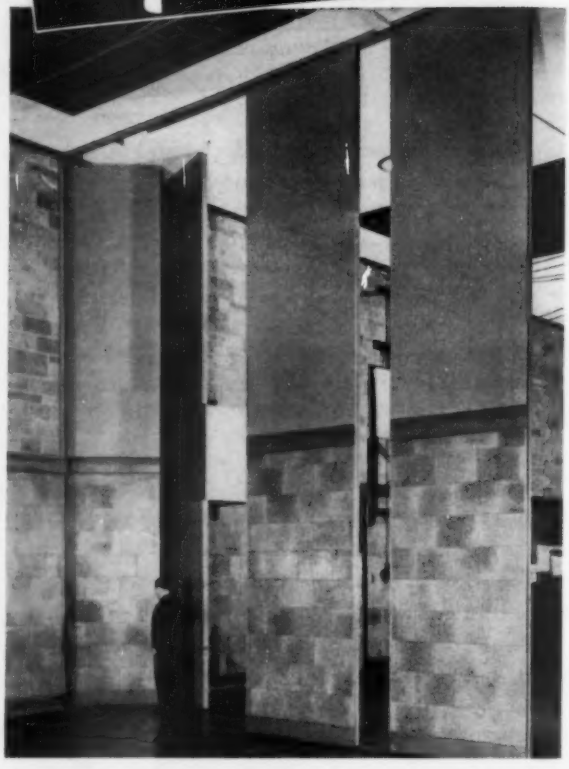
Fairhurst
TRADEMARK

FOLDING WALLS

Double the efficiency of Room Space . . . . .

The usefulness of room space may be doubled or even tripled by the use of Fairhurst Unitfold® and Unitslide® Walls. School and college management has found Fairhurst Folding Walls a most effective and economical solution to the growing need of additional space.

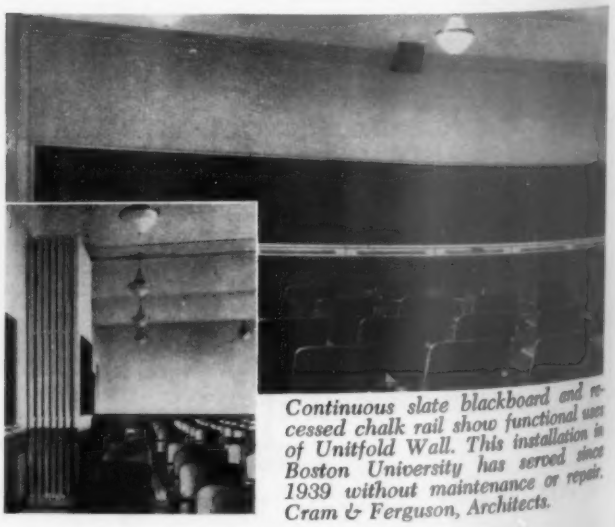
None of these features is available except in FAIRHURST FOLDING WALLS: • No visible hardware, permitting complete harmony of decoration. Rigidity is obtained without the use of bolts or hinges. • Highest sound retardance ever attained in a movable closure—equal to solid wall construction. • Automatic self-adjustment for possible deflection or building settlement. • Ability to turn corners with 2¾" radius, permitting a square corner. • Walls can operate within an inch of columns, etc. without interference. • Units can be stacked side by side with only one head and floor guide across the opening (unique with Unitslide). • Smooth, fast, dependable operation, with tight closure insured. No mechanical power required. • Foolproof design—units cannot be displaced. • Folding Walls can be locked in position with one cylinder lock. • Minimum stacking space. • Odd or even number of units of equal or varying widths may be used in any Fairhurst Folding Wall.



This gymnasium wall at Riverhead High School, Riverhead, N.Y., has given trouble-free service for 16 years. 14 units, each 5' wide, 22' high, are shown (above) being folded easily by one man, without the need for mechanical power. Wm. I. LaFon, 11, Architect.



Representative Users of Fairhurst Folding Walls: St. Peter's School, Yonkers; Wellesley College; Camp Curtin Jr. High School, Harrisburg, Pa.; Michigan State College; St. Mary Magdalene School, L.I., N.Y.; Will Rogers School, Shawnee, Okla.; Windsor Locks School, Windsor Locks, Conn.; Stevens School, Stamford, Conn.; Rensselaer Polytechnic Institute, Troy, N.Y.; State Teacher's College, New Paltz, N.Y.; Princeton University; Central Ave. School, Naugatuck, Conn.; Fremont Union High School, Sunnyvale, Calif.; Elizabeth Seton School, Yonkers, N.Y.; Student Union Bldg., State College, Pa.; Sedgwick County School, Wichita, Kansas; St. Vincent Ferrer School, New York; Wharton School (University of Pennsylvania).



Continuous slate blackboard and recessed chalk rail show functional uses of Unitfold Wall. This installation in Boston University has served since 1939 without maintenance or repair. Cram & Ferguson, Architects.

Fairhurst TRADEMARK

SCHOOL WARDROBES

the Disappearing Door Wardrobe was originated by John T. Fairhurst

PROVED BY TEST TO BE THE STRONGEST WARDROBE HARDWARE MADE.

• The upright from floor to ceiling is behind the upper hook rail and slightly in front of the lower, so that no obstruction is presented in entering or leaving the wardrobe. • The open doors do not project more than 1½" beyond the face of the wardrobe if standard recess dimensions are conformed to.

Telephone: TAlmadge 9-1304

CHURCH OF ST. BENEDICT
2956 BRUCKNER BOULEVARD
BRONX 61, N. Y. C.

June 9, 1954

John T. Fairhurst Co., Inc.
45 West 45th St.
New York 36, N.Y.

Dear Sirs:-

Your company installed the wardrobes in our school in 1931. They have been in use since that time and are as good today as the day you installed them.

Our parish has expanded so that it will be necessary to open additional classrooms this Fall. Considering the fact that Fairhurst Wardrobes were installed when the school first opened in 1931 and have given such fine service, we intend to have your company install these extra wardrobes this Summer.

Very sincerely yours,

Rev. Albert Heuring, O.S.B.
Pastor

◄ **The BEST PROOF of superiority is ACTUAL SERVICE. Read this letter for proof of value. NO MAINTENANCE EXPENSE IN 23 YEARS OF USE!**



23 Years of Constant Service

Fairhurst Wardrobe installed in 1931 at St. Benedict's School, Bronx, N.Y. There are 24 Fairhurst Wardrobes in this school. Gustave Steinback, Architect.



Typical schools with Fairhurst Wardrobe installations: P.S. #38, Jersey City, N.J.; St. Ann's School, Flushing, N.Y.; Bowers School, Manchester, Conn.; Holy Ghost School, New Hyde Park, N.Y.; Temple Beth-El, Providence, R.I.; Johnston H. Cooper Elem. School, Vallejo, Calif.; Elem. School #5, L.I., N.Y.; Barnum Woods School, L.I., N.Y.; Assumption Parochial School, Chicopee, Mass.; Englewood Cliffs School, Englewood Cliffs, N.J.; Meade St. School, Watertown, N.Y.; Rockville Center School, L.I., N.Y.; River St. High School, Red Bank, N.J.; Weager School, Stamford, Conn.; Washington St. School, Hagerstown, Md.; Delhi Township School, Cincinnati; Cleveland P.S. #114, Bronx, N.Y.; Center School, Litchfield, Conn.; St. Anne's School, Warren Point, N.J.; Lloyd H. Bugbee School, W. Hartford, Conn.

THE SANYMETAL PRODUCTS COMPANY, INC.

1702 Urbana Road • Cleveland 12, Ohio

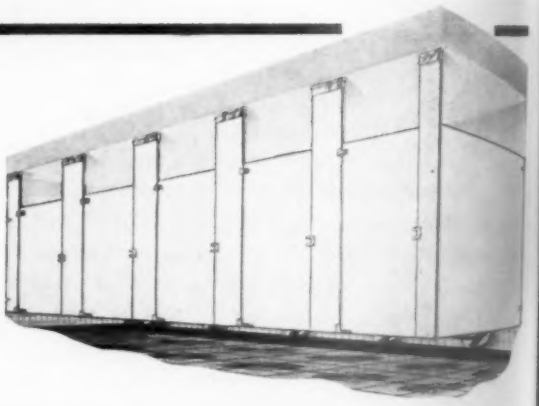
FINEST IN TOILET COMPARTMENTS • SHOWER STALLS • URINAL SCREENS

TOILET COMPARTMENTS CONSTRUCTED FOR LONG LIFE — LOW MAINTENANCE — ATTRACTIVENESS

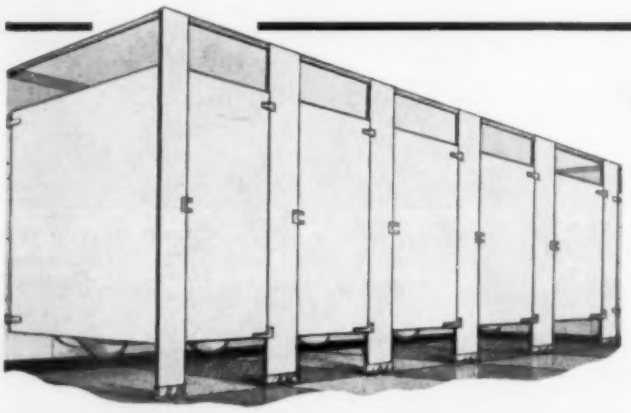
Choosing the right toilet compartments for school washrooms is highly important. Equipment that produces an atmosphere of cleanliness, dignity, and attractiveness encourages respect for and proper use of facilities. Sanymetal Compartments create such an atmosphere for the life of the building. Quality distinguishes Sanymetal construction. Designs are beautiful, and at the same time planned for strength and long life. The materials used resist severe abuse. Many unique features contribute to long service and low maintenance cost. This quality is an outgrowth of Sanymetal's 41 years' experience. Be sure you get no less.

COMPARTMENT STYLES

CENTURY Ceiling-Hung



Unobstructed floors sharply reduce maintenance and cleaning costs. Get this advantage, and the extra attractiveness of ceiling-hung design, with Sanymetal CENTURY Toilet Compartments. CENTURY Compartments are held rigid by strong, trouble-free connections to overhead carrying members, a Sanymetal patent. This style is available in all Sanymetal finishes and colors.

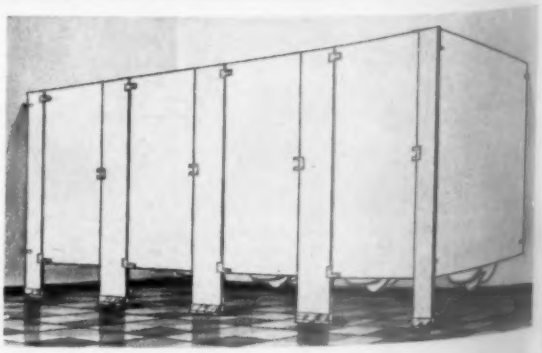


ACADEMY Floor-Supported, Overhead-Braced

Overhead bracing of ACADEMY flush-type design permits a strong, rigid installation, satisfactory where floor, subfloor, or ceiling construction is such that the usual floor- or ceiling-mounted compartments would be insufficiently rigid. Note the unique Sanymetal jackscrew leveling and supporting method, used on ACADEMY Compartments, described opposite. Available in all Sanymetal colors, finishes.

NORMANDIE Floor-Supported

The NORMANDIE is similar in every respect to Sanymetal CENTURY Compartments, except that it is floor-supported. (Before selecting this style, consult a Sanymetal Representative about the floor construction required for satisfactory installation.) Floor connections producing permanent rigidity are a Sanymetal patent. Available in all Sanymetal colors and finishes.



THE SANYMETAL PRODUCTS COMPANY, INC.

SPECIAL FOR SCHOOLS

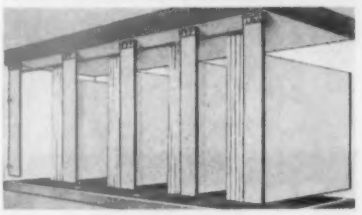
JUNIOR-HEIGHT COMPARTMENT

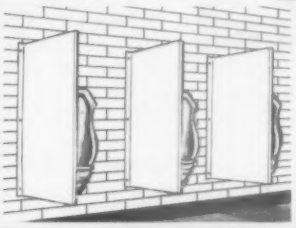
Normandie type, same quality features as full-size units. Panels and doors are at maximum 48" high, set 12" off floor, with overall maximum height of 60". Reduced dimensions are in proportion to small children up to the age of 9. Low overall height permits proper observation by supervisors, while affording child privacy from other children.



SHOWER STALLS & DRESSING COMPARTMENTS

Available in all designs. Built for long life with low maintenance. Many varied economical arrangements possible with standard parts.





URINAL SCREENS

Flush-type screens, wall-hung or floor supported, in all Sanymetal colors and finishes.

FINISHES



Sanymetal

PORCENA

(Vitreous Porcelain on Steel)

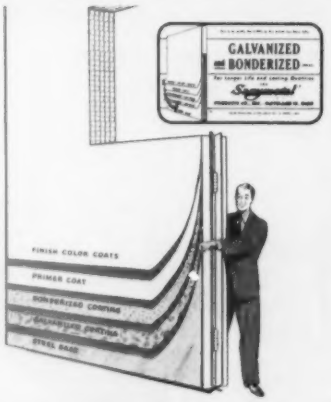
Sanymetal PORCENA meets Porcelain Enamel Institute standards for genuine, acid-resisting porcelain enamel. Hard as glass, with the natural strength of steel, it resists damage and defacement, *it never requires refinishing.*

Sanymetal

TENAC

The "TENAC" label certifies use of furniture steel, galvanized, and Bonderized**, and with two coats of quality synthetic enamel baked-on. This 4-fold protection give satisfactory service. Accept no less.

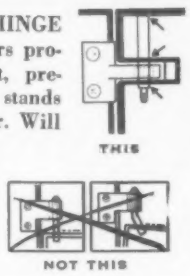
** Bonderite—product of Parker Rust Proof Co.



WHAT TO LOOK FOR:

OUTSTANDING EXAMPLES OF SANYMETAL'S MANY QUALITY MECHANICAL FEATURES—DIFFERENCES THAT GIVE YOU YOUR MONEY'S WORTH IN SERVICE.

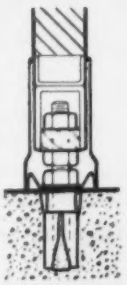
INSET TYPE TOP HINGE on all Sanymetal doors provides 3-point support, prevents misalignments, stands abuse, eliminates wear. Will support the weight of an adult swinging on door without damage.



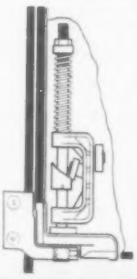
WELDED DOOR UNIT construction provides a door panel that stays flat without wind and in line even when it is severely abused. Door surfaces are welded at the edges to form a strong structural unit.



TROUBLE-FREE FLOOR CONNECTIONS by a Sanymetal patented method produce firm, rigid connections for floor-braced types. Fittings are heavy duty and concealed. Ceiling connections are same design.

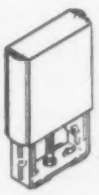


FULLY CONCEALED BOTTOM HINGE (by test proved to give over 301,000 cycles of use without noticeable wear.) Controlled-action positions door. Fully bearingized, always works easily.





QUICK, PERMANENT LEVELING by built-in jackscrew saves field labor. Screw supports compartment weight direct to floor, cannot slip. Holds overhead-braced compartment permanently in line.



STAINLESS STEEL FLOOR MOP MOLD assures long life and attractiveness, withstands exposure to cleaning materials, acids, scuffing and abrasion.



SEND FOR *Catalog 92, describing all Sanymetal Compartments (or see Sweet's, file* $\frac{21b}{5a}$ *) for full description of all Sanymetal Products.*

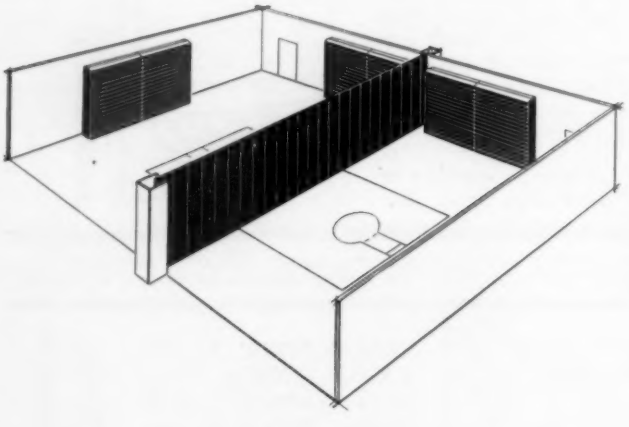
WAYNE IRON WORKS

Wayne Penna.

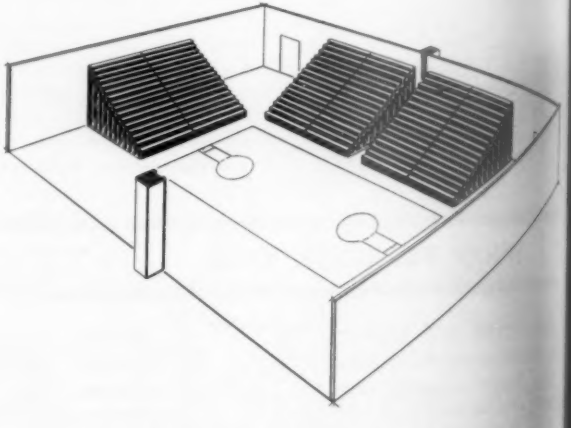
WAYNE AUTOMATIC ELECTRIC FOLDING PARTITIONS for GYMNASIUM · CLASSROOM · AUDITORIUM

In the planning of new schools, Wayne Automatic Electric Folding Partitions are the key to economical design. By converting gymnasium, auditorium, and exhibition areas into separate spaces, these facilities are made available for many different purposes.

Wayne folding partitions are custom engineered to specific requirements so as to divide a single area with a sound-proof partition effectively and automatically. Two or more intra-school, classroom, or other activities may be carried on simultaneously in what was previously a single area.



Wayne Automatic Electric Folding Partition extended, with 16-row Wayne Gymstands in closed position.



Wayne Automatic Electric Folding Partition folded, with 16-row Wayne Gymstands in open position.

Design and Construction

Wayne Automatic Electric Folding Partitions are designed to individual requirements. The installation provides hinged panels in series which, when fully extended, present a flush surface approximating a solid wall. This will readily accept any decoration in keeping with the gymnasium or auditorium. The unit is built to withstand normal abuse, shock, and wear.

The folding and unfolding operations are fully automatic and powered by an electric motor operating a sprocket and chain drive. Control is provided by an electrical key switch located in a convenient position for the operator. The key may be removed to prevent operation by unauthorized persons.

Wayne partitions travel on a 4″ I-beam track. The trolleys employ side guide rails and rollers to insure friction-free straight line motion. *No floor track is required.* This leaves the floor area free from obstacles when the partition is in a folded position.

During the opening and closing operations of the partition panels, a 1″ clearance is maintained between the base of the panels and the floor. In the final closing movement, a sealing strip in the bottom of each panel is caused to drop sufficiently to seal automatically the space between the floor and panels. This locks the entire structure in position.

WAYNE AUTOMATIC ELECTRIC FOLDING PARTITIONS



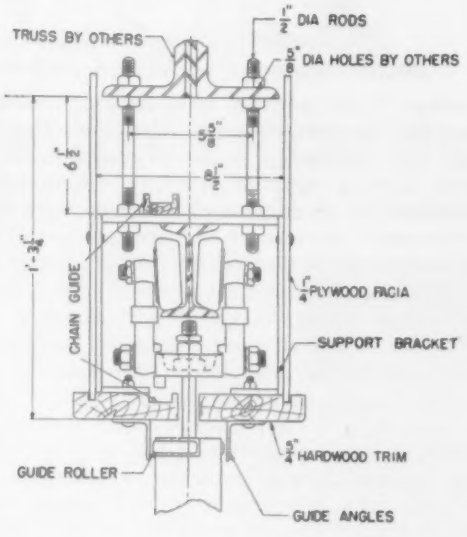
Wayne Automatic Electric Folding Partitions shown installed in a typical school gymnasium.



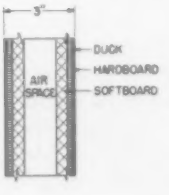
Wayne Automatic Electric Folding Partitions shown installed in a typical classroom.

Partition Panel Construction

Wayne folding partitions are available in three basic types of panel construction. Other types of panel construction are available where standard types do not meet special requirements. Consult your Wayne representative or write direct for information concerning your specific problem.

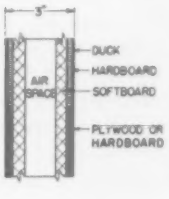


a



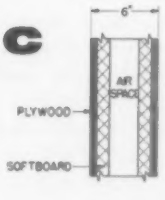
Two layers of softboard insulation
Two layers of hardboard
Covered with No. 10 duck

b

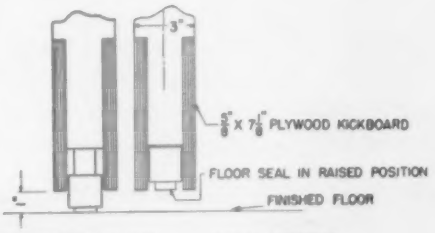


Two layers of softboard insulation
Two layers of hardboard
Covered with No. 10 duck
Plywood or hardboard wainscot

c



Two layers of softboard insulation
Both faces covered full height with plywood or hardboard.



LOCKED POSITION OF AUTOMATIC SOUNDPROOF FLOOR SEALS WHEN PARTITION IS EXTENDED

CROSS SECTION FOLDING PARTITION

"Wayne Stands for Safety"

WAYNE IRON WORKS, 544 N. Pembroke Avenue, Wayne, Penna.

BENJAMIN ELECTRIC MFG. CO.

Crysteel Div., Des Plaines, Ill.

BENJAMIN PORCENELL CHALKBOARDS

A Decided Step Forward in Better Seeing and Visual Instruction

Porcenell is an entirely new type of chalkboard. It is expressly designed for the visual welfare of the student. The unusually smooth, green Porcenell Chalkboard surface aids in creating wholesome visibility conditions for students and teachers. Such an improved environment does much to reduce eye fatigue and increase the ability to concentrate.

In addition to contributing to a better visual environment for learning, Porcenell Chalkboards have many performance advantages. Porcenell really does not fall within any of the present-day classifications of chalkboards. It is not slate, plastic or glass . . . not composition board . . . not conventional porcelain enamel. Rather, it is a completely NEW and different surface which is basically a vitreous or silicate coating. New materials and manufacturing processes make it possible to market this superior classroom chalkboard at a cost within reasonable budget limitations.

In respect to its durability, Porcenell is similar to porcelain enamel. Its inert vitreous finish will not fade or discolor with age. However, a newly-developed process which makes it possible to bond Porcenell to steel at lower temperatures, permits the use of lighter-weight, more inexpensive steels. This cuts down weight for easier installation and reduces the final cost to you.

A Better Writing Surface

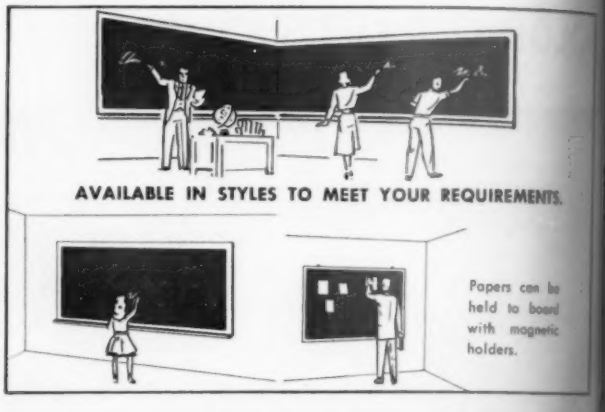
The micro-fine, glass-hard surface of the Benjamin Porcenell Chalkboard makes it much smoother and more effortless to write upon. A unique electro-static spray method used in manufacture results in a near-perfect continuity of surface. Microscopic "peaks and valleys" of the finish are evened out, producing a velvety suede-like, higher-quality writing surface.

Easier to Clean

Benjamin Porcenell Chalkbords have a non-porous surface which makes cleaning trouble-free. There are no tiny depressions in the finish to trap particles of chalk as the eraser glides across. With Porcenell, all the chalk is easily erased without use of excess pressure . . . without leaving "ghosts." Porcenell, being moisture-proof and non-absorbent also simplifies periodic "major cleaning jobs." Even excessive use of water will not loosen, delaminate or mildew the Porcenell surface; and it returns to its original green color.

Superior Durability

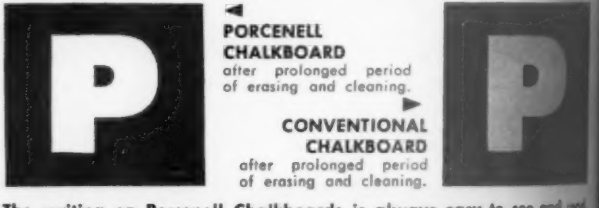
Exhaustive tests, research and development over a period of 15 years with an expenditure of more than ¾ of a million dollars, have resulted in a surface that is durable, resistant to chipping and withstands impact. Porcenell is warp-proof, too, because elimination of critical-range temperatures during manufacture assures a surface that will not distort.



AVAILABLE IN STYLES TO MEET YOUR REQUIREMENTS.

Papers can be held to board with magnetic holders.

Maximum Visibility



The writing on Porcenell Chalkboards is always easy to see and read. Even years of cleaning will not cause excessive "whitening" . . . even years of erasing will not materially affect the matte finish of the surface. There are no "blind" spots to cause hardship to students in certain parts of the classroom. The approved green color will not fade because it is an integral part of the fused surface.

Lower Cost-Installation

Porcenell brings down the high cost of chalkboard installation because it is easier to handle during the mounting operation. A 4′ x 8′ Porcenell sheet actually weighs up to 48 pounds less than a porcelain enamel board of the same size! This naturally reduces the time and amount of labor for an installation job. Further, Porcenell may be drilled or sawed right on the job. With reasonable care, chipping is so negligible that it is almost impossible to see any irregularities in the surface where workmen have drilled mounting holes or cut the board right on the job at time of installation.

SPECIFICATIONS

PORCENELL AVAILABLE IN TWO STYLES:

1. **Porcenell Chalksheet.** Porcenell is fused to 22-gauge cold rolled commercial quality stretcher leveled steel. Has prime coat of Porcenell on both sides, as well as a coat of matte green finish on one side.
2. **Porcenell Chalkboard.** Porcenell surface is fused to 22-gauge cold rolled commercial quality stretcher leveled steel. This is laminated to ¼" Presdwood planed sheet. Has prime coat of Porcenell on one side only, covered with a coat of matte green finish Porcenell.

SIZES AVAILABLE:	*COLOR:*	*WEIGHT:*
Widths: 3′, 3½′ and 4′ **Lengths:** 4′, 6′, 8′ and 10′. Odd sizes furnished on special orders.	Light Green Medium Green Dark Green	2½ lbs. per sq. ft. (including ¼" Presdwood backing, unpacked).

BANCORK
bulletin boards

for modern educational methods



Parkland High School
Route #3, Allentown, Pa.
Calvin S. Frankenfield, Supt.
H. F. Everett & Associates,
Architects

Bancork Bulletin Boards
used throughout.



BANGOR CORK COMPANY
Members N.S.S.I.—N.E.A.
Pen Argyl, Pa.

BANCORK BULLETIN BOARD is available in TWELVE COLORS

It can be furnished in full rolls 4′ and 6′ wide by approximately 85′ long, or, cut to your given sizes. Or, it can be cut to your given sizes and laminated to various backing boards (see selector guide below)



THE BANGOR CORK COMPANY

has been exclusively a manufacturer of precision-made bulletin boards since 1936, when it was finally proven by rigid field-testing that it was possible to produce and market an economical and practical bulletin board that would not be difficult to install or maintain. Sellers and manufacturers of quality school equipment since 1920, Bangor Cork Company has both a knowledge of classroom techniques and a knowledge of design and manufacturing that it combines to produce precision-made bulletin boards that perform as modern educators demand.

BANCORK IS THE FINEST CORK OBTAINABLE

Made in roll and sheet form especially for bulletin board use, Bancork is absolutely uniform in density and thickness. Its specially compounded binder insures pliability and softness during the entire life of the material. Bancork is furnished unmounted, ¼″ thick, or mounted on various types of backing boards to obtain desired thickness. Satisfaction GUARANTEED.

Bancork Bulletin Board material retains its tackholding quality despite repeated use of the same spot. The soft texture makes tack removal easy, without the use of tack pullers. Tack holes fill quickly, because of the resilience of the bulletin board composition.

Bancork provides needed display space . . . in schools, offices, churches, hospitals . . . wherever bulletin boards are needed for posting announcements, classwork, pictures, examination results, program schedules, publicity, etc.

MOUNTED OR UNMOUNTED

Bancork Bulletin Board material unmounted can be furnished in full rolls or cut to your given sizes, or it can be supplied mounted on materials selected for their strength and resistance to warp and bend. ⅛″ cork is mounted on ¼″ Masonite Quarterboard for a ⅜″ thickness and ⅜″ Homasote for a ½″ overall thickness. All ¼″ cork is mounted on Masonite, either ⅛″ or ¼″ Presdwood according to the overall thickness desired or ¼″ Quarterboard. The wood fibers of Masonite are forever bonded with lignin . . . the same natural binder that holds together the wood fibers in trees. Because no artificial or synthetic adhesives or binders are used, the wood fibers will not disintegrate or soften in the presence of moisture. This assures better service during a longer effective life to provide an economy not inherent with all corkboard backings. (Other thicknesses and types of backing board furnished if desired.)

INSTALLATION

Unmounted Bancork Bulletin Board, ¼″ thick, can be cemented to any smooth plastered wall or wall board with Banco Cork Paste. Mounted bulletin board, ⅜″ or ½″ thick, can be applied to any type wall with Banco Mastic Cement. Installation instructions will be furnished by the Bangor Cork Company upon request.

SELECTION

To serve the design of modern buildings, Bancork is available in a variety of colors and mounting thickness that make possible pleasant combinations that harmonize with chalkboard finishes and room furnishing. All Bancork Bulletin Boards have a sanded finish and burlap backing . . . ready for installation and use.







MAINTENANCE

Because Bancork Bulletin Board has been manufactured with the color a part of the corkboard material (going all the way through), the corkboard will withstand years of constant use without requiring painting or other surface refinishing. Routine soil spots from fingers and dust can usually be removed with art gum or other soft rubber eraser. The only general maintenance that is needed is an occasional washing to remove surface soil: the surface is rubbed lightly with a soft cloth that has been dampened with a lukewarm solution of one cup of Armstrong's liquid cleaner to five gallons of water. Hard scrubbing or abrasive cleaners are injurious to the surface, and should be avoided.

LIGHT REFLECTANCE

In order to reduce the eyestrain and resultant nervous fatigue that comes from looking at wall areas of varying brightness, the finely textured surface of Bancork Bulletin Board has been designed with the relatively high light reflectance of commonly used wall paints and other common wall coverings. It is not necessary, with Bancork Bulletin Board, to decorate to accommodate the corkboard; Bancork will accommodate whatever colors and finishes you would customarily use.

METAL JOINT STRIP

Bancork Bulletin Boards and Banrite Chalkboards can be firmly joined with metal joint strips, if so desired, to provide a neat joint in matching colors. This strip also allows for expansion and contraction of the boards due to atmospheric conditions and eliminates the unsightly appearance which butted joints sometimes develop.



ADHESIVES

Paste for installing unmounted Bancork Bulletin Board, and Banco Mastic Cement for installing mounted bulletin board, Banrite Chalkboards and slate blackboards are available in 1 gallon and 5 gallon containers. These adhesives, the result of patient testing for secure bonding without expensive or troublesome installation, are available from all Bangor Cork Company dealers.

COLORS AVAILABLE

in ¼" Gauge
#752 Sage Green ■
754 Pueblo Gray
756 Cork Tan ■
758 Coral
BC-2 Toast Tan
BC-4 Field Green
BC-6 Beach Gray
BC-8 Spray Green
BC-10 Wheat Tan
BC-12 Yellow Gold
BC-14 Powder Blue
BC-16 Dawn Pink

SPECIFICATIONS

backing	total thickness	overall size, maximum	shipping weight per sq. ft.
none	¼"	6' x 85'	1 lb.
⅛" Presdwood	⅜"	4' x 12'	1¾ lb.
¼" Presdwood	½"	4' x 12'	2¼ lb.
¼" Quarterboard	½"	4' x 12'	2 lb.

■ #752 Sage Green and #756 Cork Tan are also available in ⅛" gauge. They can be mounted either on ¼" Quarterboard or ⅜" Homasote in any size up to 4' x 12'. Shipping weight 1½ lb. per sq. ft.

FRAMED BULLETIN BOARDS AND CHALKBOARDS



Bancork Bulletin Board material and Banrite Chalkboards can be furnished with a 1⅞" Oak frame or a ⅜" aluminum edging moulding in the following sizes: 18" x 24", 24" x 36", 36" x 48". The following sizes: 36" x 72", 42" x 72", and 48" x 72" can only be furnished with 1⅞" Oak frame.

Cabinet Type glass enclosed bulletin boards can be furnished size 30" x 36" single door and 48" x 30" double door. Cabinet is solid Oak, natural finish, with lock and key. Other sizes upon request.

Floor Stand Boards can be furnished with Bancork Bulletin Board on one or both sides, or, with bulletin board on one side and Banrite Chalkboard on the other, in the following sizes: 3′ x 5′, 3′6" x 5′ and 4′ x 6′. Floor Stands are solid oak, natural finish.

BANRITE chalkboards

Smooth Vinyl surfaced for long wear



Banrite Chalkboards are made for functional durability, and are designed to harmonize with modern and traditional architectural and light reflectance requirements of classrooms.

The non-glare, smooth finish of Banrite Schoolastic Green provides a shade of green that is the result of research into the factors of light reflectance, eyestrain, nervous fatigue, contrast with chalk, and readability. It achieves maximum visibility and minimum light-wave vibration of chalk lines, drawings and letters.

The abrasive materials used in the finish are intimately bound together with Vinyl Plastic. This combination provides the necessary "bite" for excellent chalk acceptance, together with the highest degree of abrasion resistance. It takes a full clean chalk mark and is easily erased. The surface is unaffected by water and readily cleans to its original shade of non-fading green.

Banrite Schoolastic Green DUO-LUX Chalkboard is a board of high quality and great strength at a medium cost. It can be furnished in ¼" and ½" thicknesses. It consists of primer and finishing coats of Vinyl Plastic, the most modern and durable material available, bonded to Masonite Duolux.

Banrite Schoolastic Green PAN-NEL Chalkboard is a board of good quality at a low cost. It can be furnished in ¼" thickness and consists of primer and finishing coats of Vinyl Plastic bonded to Masonite Panelwood.

These boards are light in weight and are designed to prevent warping and breaking. They are uniform in thickness and available in any size up to 4′ wide by 12′ long. Lengths longer than 12′ can be furnished in two or three equal pieces, and can be set with matched joints or metal joint strips of the same color. It can be nailed to wood grounds at the top or cemented to the wall with our Banco Mastic Cement.

FURTHER INFORMATION AVAILABLE

Bancork Bulletin Boards and Banrite Chalkboards are available from dealers throughout the United States. If there is no dealer in your locality or you desire additional information or specifications, write direct to Bangor Cork Company, Pen Argyl, Pa.

PRINTED IN U.S.A. '51

CLARIDGE PRODUCTS and EQUIPMENT, Inc.

6731-6733 No. Olmsted Avenue, Chicago 31, Illinois

Manufacturers of CHALKBOARDS ● CORKBOARDS ● TRIM ● SCHOOL EQUIPMENT

PROVIDES ALL NEEDS IN

CHALKBOARDS

and BULLETIN BOARDS

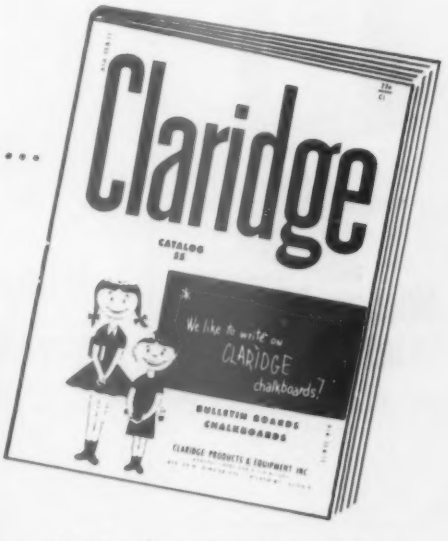


The Record shows... Claridge pioneered a phenomenal number of Chalkboard FIRSTS!... new improvements now nearly all adopted by the Industry. This quest for better materials and manufacturing continues... helping further to make CLARIDGE a distinguished name in the field. Hundreds of Architects and School Administrators enthusiastically recommend CLARIDGE Chalkboards.

GRAPHOLITE.. low price, good quality. **STRUCTOPLATE**.. fine performance under all conditions, all types of buildings. **DURACITE**.. 100 years performance under average use. **ASBESTOCITE**.. most revolutionary cement asbestos chalkboard in 25 years! **VITRACITE**.. vitreous porcelain enamel steel chalkboard, guaranteed for life of any building.

CLARIDGE meets your most exacting requirements

Send today for...



Catalog 55 with complete information on chalkboards, bulletin boards, and aluminum trim.

Claridge

INLAND STEEL PRODUCTS COMPANY

4031 W. Burnham Street, Milwaukee 1, Wisconsin

BALTIMORE 5, MD. — 5300 Pulaski Highway • BUFFALO 11, N. Y. — 64 Rapin St. • CHICAGO 9, ILL. — 4301 S. Western Blvd. • CINCINNATI 25, OHIO — 3240 Spring Grove Ave. • CLEVELAND 14, OHIO — 1541 E. 38th St. • DETROIT 2, MICH. — 690 Amsterdam Ave. • KANSAS CITY 41, MO. — P. O. Box 918 • LOS ANGELES 58, CALIF. — 4807 E. 49th St. • NEW YORK 17, N. Y. — 230 Park Ave. • ST. LOUIS 10, MO. — 4215 Clayton Ave.

MILCOR

REG. U. S. PAT. OFF.

Metal Trim

meets school requirements for safety ☆ service ☆ sanitation

Permanence, fire safety, and resistance to abuse are inherent advantages of Milcor Metal Trim. The complete line includes two basic types: *flush*, or plastered-in; and *applied*, or removable.
By combining various designs of window trim, stools, mouldings, and bases, you can obtain almost any interior architectural effect.

MILCOR SOUND-DEADENING INSULMAT

Greatly reduces sound reverberation. Fire-resistant composition applied to all styles of Milcor Metal Trim at slight additional cost. Regularly furnished on Milcor Chalk Trough *at no extra cost.*



Milcor Chalk Trough and Blackboard Trim

A wide selection of moulds and fittings in sizes and types to meet every blackboard design need. All chalk trough furnished with sound-deadening Insulmat backing.





Milcor Metal Window Trim

Furnished in either standard or expanded plaster flange. Available as completely mitred, welded frame, ready to install, or individual units—flush or projecting—which can be used separately or in combination to form any part of window opening. Complete or ¾ frames in any size to meet specifications up to 8′ x 12′. Square, projecting, or radius stools.

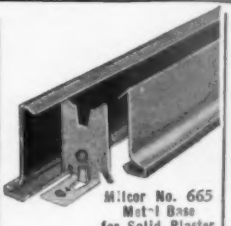


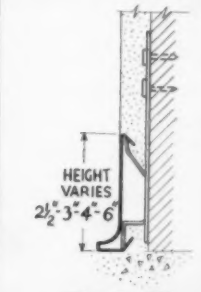
Milcor Metal Access Doors

Three types, with or without expanded metal wing. Fit flush to wall—provide access to utility and wiring systems. New spring hinge permits door to open 175° for easy work entry. Sizes from 8″ x 8″ x 24″ x 36″. Flush, cam-type lock. Number of hinges and locks determined by size of door.

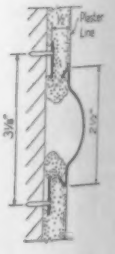












Milcor Metal Bases, Chair Rails

Many practical designs, sizes, and weights. With prime-coat, to accept any subsequent painting or decorative treatment. Corner fittings and terminals to match. Chair rail, mouldings, and other accessories available.

Write for free **MILCOR METAL TRIM Catalog!**

INLAND STEEL PRODUCTS COMPANY

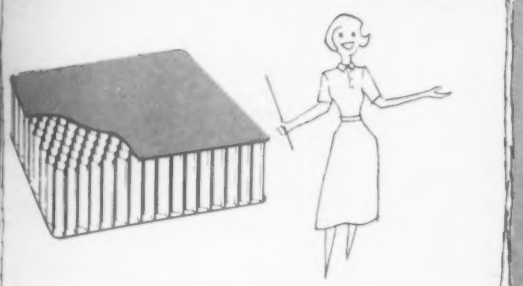
4031 W. BURNHAM STREET — MILWAUKEE 1, WISCONSIN

THE JECMEN COMPANY

4608 West 20th St., Chicago 50, Ill.

whenever you want the best in CHALKBOARD BULLETIN BOARD or a COMBINATION...

you want JECMEN

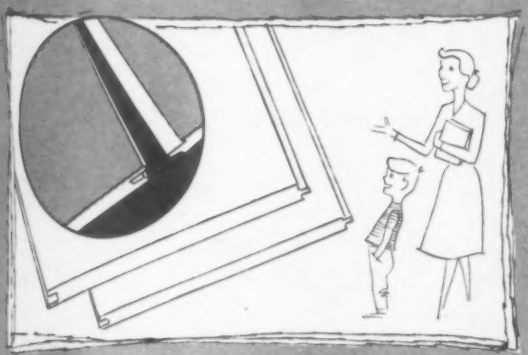


JECMEN SKYRITE

Steel Face, Steel Back—Honeycomb Core—Vitreous Enamel Writing Surface.

Skyrite Chalkboard consists of two steel faces, held in suspension by Aircomb — Douglas Aircraft's light, strong honeycomb filler material. The result is a perfectly balanced laminate — or a structural sandwich, full ½" thick.

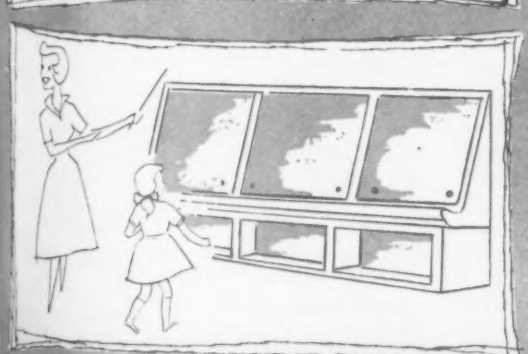
Superb Vitreous Enamel writing surface, as recommended by Porcelain Enamel Institute. Skyrite will not buckle, warp, sag or delaminate under any conditions. Lifetime Guarantee.



JECMEN AUTOGRAPH

The Only ¼" Chalkboard With a Tongue and Groove Joint!

In Autograph Chalkboard, Jecmen introduces a totally new chalkboard concept. It is the industry's ONLY ¼" thick chalkboard with a tongue-and-groove joint . . . self-aligning, tight-sealing, spreadproof . . . offers positive prevention of uneven planes. Matchless V-200 writing surface . . . durable, water-proof tempered hardboard back. IMPERIAL CHALKBOARD — ½" Thick, V-200 writing surface . . . tongue-and-groove joint!



JECMEN VERS-A-TILT

Prefabricated, Aluminum, Slanted, Reversible, Adjustable!

Here's the dream chalkboard, Vers-A-Tilt installs quickly and easily, can be adjusted from "1st grader height" to "8th grader height" in just a few minutes. Vers-A-Tilt is SLANTED for greater writing convenience and for the elimination of glare.

To DOUBLE this amazing unit's usefulness, Vers-A-Tilt is DOUBLE-FACED! One face is Jecmen's celebrated V-200 chalkboard writing surface — the other side is Jecmen's resilient cork surfaced bulletin board Handy storage compartment behind each face panel . . . and a natural place for shelves or cabinets directly beneath each Vers-A-Tilt unit.

GET COMPLETE INFORMATION TODAY!
Ask for Samples — Ask for Catalog

The Jecmen Chalkboard-Corkboard Line Includes:

Skyrite Autograph E-Kon-O-Board E-Kon-O-Kork
Imperial Century Top Grade Bulletin Board Vers-A-Tilt

JECMEN

THE JECMEN COMPANY

4608 WEST 20th STREET • CHICAGO 50, ILL.

NATURAL SLATE BLACKBOARD CO.
and THE STRUCTURAL SLATE CO.

Pen Argyl, Pennsylvania

500 Million years-Young...

natural slate



CHALKBOARDS

The fundamental purpose of the chalkboard is to convey the written message to the students. Instantaneous resolution of the writing task is best achieved through the contrast of white chalk on slate. In addition, its "slate grey" color makes possible a desirable effect with any color scheme . . . its writing surface has set the standard to which other chalkboards are compared. Easy to clean and maintain, virtually indestructible . . . Natural Slate provides the lowest annual cost of any chalkboard.

STRUCTURAL USES

Belying its age-old origin, Natural Slate is recognized today as the perfect complement to modern design and decor. Its neutral color injects a rich, subdued effect to today's colorful decorating schemes. It is sanitary, durable, strong, non-absorptive and will not contract or expand.

LABORATORY USES

Slate's natural resistance to chemicals, its non-absorptive qualities and tensile strength have broadened its use to practically all laboratory furniture and equipment. Availability in pieces up to 7' in length eliminate jointing in most instances. The results of chemical corrosion tests in Natural Slate (copies on request) indicate without question the superiority of Slate in the laboratory.

Write for your copies of information on any or all of the uses of Natural Slate.



PENNSYLVANIA SLATE PRODUCERS GUILD, INC.

205 Realty Building, Pen Argyl, Pennsylvania

A trade association dedicated to serve those interested in the advantages of using natural slate products

Natural Slate



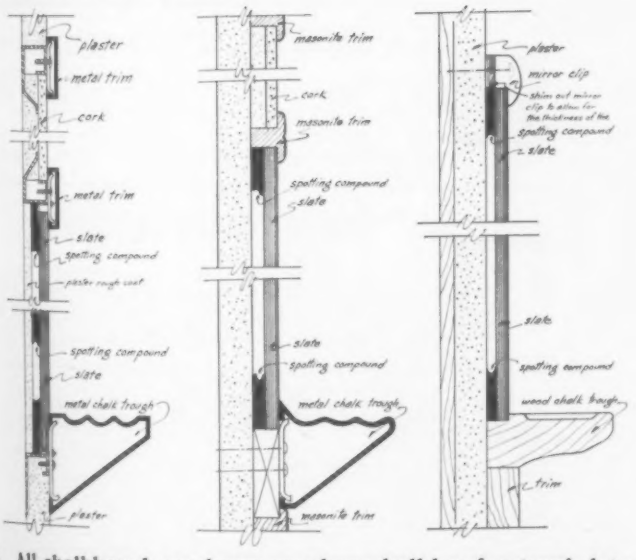


Ralph R. Smith School, Hyde Park, N. Y.
Perkins & Will, architects—engineers, Chicago, Ill.

still THE WISEST CHOICE IN CHALKBOARDS

There are reasons which prompted the choice of slate in such exemplary school installations as the recently erected Ralph R. Smith Elementary School in Hyde Park, N.Y., pictured above. Natural slate is easiest to see . . . to clean . . . to budget . . . to adapt to color schemes. It is the best attention catcher, has the longest life and best writing qualities.

SPECIFICATIONS



1. All chalkboards as shown on plans shall be of natural slate, quarried and fabricated in U.S.A.
2. Thickness, width, and lengths as customary for slate chalkboards.
3. The slate shall be of finest quality selected blackboard stock, even in color, and free from ribbons or imperfections, that would impair its use or durability as a writing surface.
4. The slate chalkboards shall be installed in accordance with the architect's detail and approved manufacturer's installation drawing.

Other Uses of Slate in the School

Roofing	Shower Compartments
Baseboards	Laboratory Table Tops
Sinks	Toilet Stalls
Window Sills	Window Stools
Flooring	Shelves

Write for information

on chalkboard selection, use and care. Personal assistance, if you wish, with chalkboard selection . . . no obligation.



"500 million years in the making"... NATURAL SLATE

E. W. A. ROWLES CO.

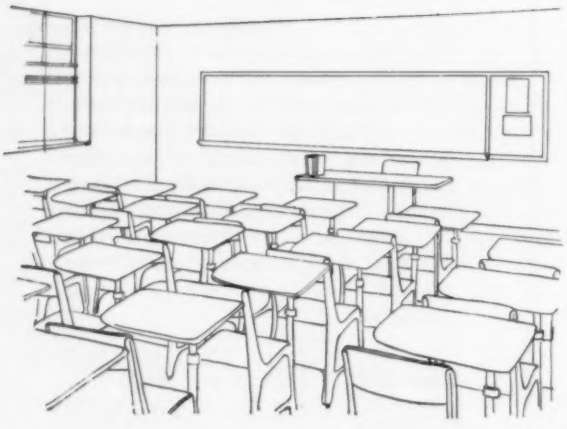
Manufacturers of School Equipment, Classroom Seating and School Furniture

Arlington Heights, Illinois

For better

classroom living . . .

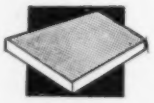
ROWLES SCHOOL EQUIPMENT





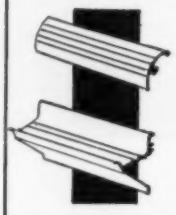
See-GREEN CHALKBOARDS

A new soft, pleasing light green color that makes class rooms brighter, lighter and more cheerful. Rowles offers four famous chalkboards—ENDURAROC, Super PERMA-SITE, PERMASITE and DUROPLATE—one to fill every specification. All four available in See-GREEN or black.



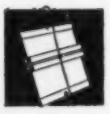
See-GREEN BULLETIN BOARDS

A fresh inviting new light green color for cork boards harmonizes perfectly with See-GREEN Chalkboards. Available in Perma Kork, 1/4" unmounted or 1/2" mounted. Also DURATEX, 1/8" cork bonded to 3/8" fiberboard. Also regular tan.



ALUMINUM CHALKBOARD TRIM

Bright satin-finished aluminum moldings for trimming chalkboards and bulletin boards. A complete line for every type of installation. Modern, durable and easy to install. Matching chalk trough.



MASTERMADE WINDOW SHADES

Rowles has a complete line of high quality cotton duck shades for efficient control of classroom lighting. Shades are available to fit any type of window opening, regardless of size or shape of opening.



LITE-TITE DARKENING SHADES

Rowles is your headquarters for all your darkening equipment. Double-coated leatherette shades for total blackout, or black cotton duck shades for darkening classrooms for audio-visual purposes.



LITE-TITE DARKENING CHANNELS

Increases the efficiency of your darkening shades. Aluminum or metal channels completely eliminate all light and give 100% blackout. Very attractive, durable and easily installed.

See your local ROWLES SCHOOL EQUIPMENT DEALER

ROWLES
School Equipment

For authoritative help in planning your classrooms, ask your local Rowles School Equipment dealer for copies of these big Rowles School Equipment catalogs, or write direct to

E. W. A. ROWLES COMPANY
ARLINGTON HEIGHTS, ILLINOIS



UNITED STATES PLYWOOD CORPORATION

Dept. ASU-55, 55 West 44th St., New York 36, N. Y.

WELDWOOD CHALKBOARD

Perfect writing surface takes chalk beautifully without chalk "squeal" or chatter. Easily and quickly erased with standard erasers.

Nature's color—restful Chlorophyll Green—is used for maximum readability; tests show it's the best background color for chalk ever devised.

Magnets stick to porcelain-on-steel* face making your chalkboard a bulletin board, too! Permits easy posting of papers and visual aids.

Cannot break or shatter under impact, stress, temperature changes or concussion; will not warp or buckle.

Guaranteed for life of the building in which it is installed, *never* needs replacement or refinishing. First cost is last cost!

New Trim! Chalkboard now available with Weldwood Aluminum Trim that costs less than any similar product on the market.

**Porcelain enamel surface produced by The Bettinger Corp.*



WELDWOOD CHALKBOARD installation in the social studies room of Valhalla Junior High School, Valhalla, N. Y.

ARMORPLY COUNTER TOPS

Top surface of easy-to-clean stainless steel bonded to Weldwood Plywood makes an ideal counter top or work surface for cafeterias and laboratories.

Less expensive to install because it's easy to work with, Armorply also saves on material costs since the Armorply process uses less costly thin-gauge metal.



IN COUNTER TOPS Armorply combines the stiffness and workability of plywood with the durability and toughness of metal.



SLIDING CABINET DOORS and classroom walls of Novoply are used throughout the Unqua School, Massapequa, Long Island, N. Y.

NOVOPLY®

Low-cost Novoply is the most dimensionally stable wood panel ever produced! It's practically warp-free.

Its tough, hard surface cuts maintenance costs . . . stands up to years of rough-and-tumble treatment anywhere in the school.

Easily installed, Novoply panels speed up building schedules for wall paneling, cabinets, wainscoting, wardrobe doors, table tops, partitions, built-ins, even furniture.

Novoply is perfect for either new construction or a modernization program geared to new school beauty at low cost.

For FREE Booklets and Specifications, write

UNITED STATES PLYWOOD CORPORATION

Dept. ASU-55, 55 West 44th St., New York 36, N. Y.

ESTABLISHED
Since 1828

CORNELL IRON WORKS, INC.

36th Avenue at 12th Street, Long Island City 6, N. Y.

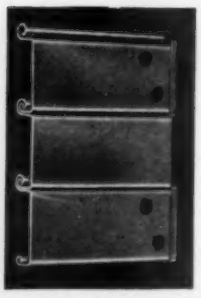
Members of the One Hundred Year Association, Inc., of New York

102 REPRESENTATIVES IN PRINCIPAL CITIES

127th ANNIVERSARY

Telephone STillwell 4-3800-1-2





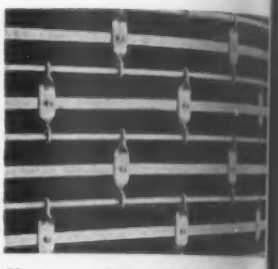
Small 1¼" Slat—for FLUSH SURFACE Doors, shutters etc. of average width

PRODUCTS

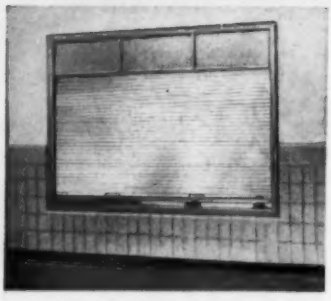
ROLLING GRILLES and GATES in steel and other metals; SLIDING GRILLES in steel and aluminum; ROLLING DOORS and SHUTTERS in steel, other metals and wood. Underwriter's labeled ROLLING STEEL FIRE DOORS, also approved by Factory Mutuals, et al; ESCALATOR FIRE ENCLOSURES; MOTOR OPERATORS. Makers of fine doors since 1828.

METALS USED

In addition to Galvanized Steel, Rolling Doors (except for fire protection) and Rolling Grilles can be made in Aluminum, Bronze, Nickel-Bronze or Stainless Steel.



Close-up view of ROLLING GRILLE curtain, CORNELL Standard Butterfly Type



CORNELL ROLLING SHUTTERS. Recommended for kitchens, lunch counters, cabinets, school stores, school bank, checkroom, etc.

SEND FOR FREE CATALOG

CORNELL ROLLING DOORS and ROLLING GRILLES

The Rolling Doors are made up of interlocking metal slats running in vertical metal side guides, flexible to coil. Steel curtains are hot galvanized. Rolling shutters for counters, etc. are made of a special design 1¼" flat slat giving a flush surface on the outside. Wood slats strung on metal cables form the curtain of wood rolling doors.

Rolling Fire Doors are labeled by Underwriter's Laboratories, Inc., for fire walls, etc., and carry a 3 hour test label.

Cornell Iron Works, Inc., are the originators of the Rolling Grille in America. Cornell Rolling Grilles operate like rolling doors, but they do not block light, air, or vision. They have been widely accepted for school corridors, etc. Can be completely concealed when open. Patented Locking Device for Rolling Grilles is workable from either side.

ROLLING GRILLE SPECIFICATIONS

Rolling Grilles shall be Butterfly Type. The grille curtains shall be made of 5/16" round hard drawn galvanized steel bars running continuous horizontally from jamb to jamb and locked into rolled steel vertical side guides. The horizontal bars are flexibly connected by strong vertical metal links, riveted to galvanized flat bars, which permit the entire grille to coil overhead. No openings in the grille shall be large enough to pass a 1½" diameter ball through. The ends of the bars shall be provided with straight continuous malleable, or steel, endlinks of self-aligning construction, each link locking in the lips of the side guide to prevent pulling out of the grille.

RECOMMENDED FINISH SPECIFICATIONS

ALL GALVANIZED STEEL GRILLES shall be sprayed with aluminum paint, or bronze paint.

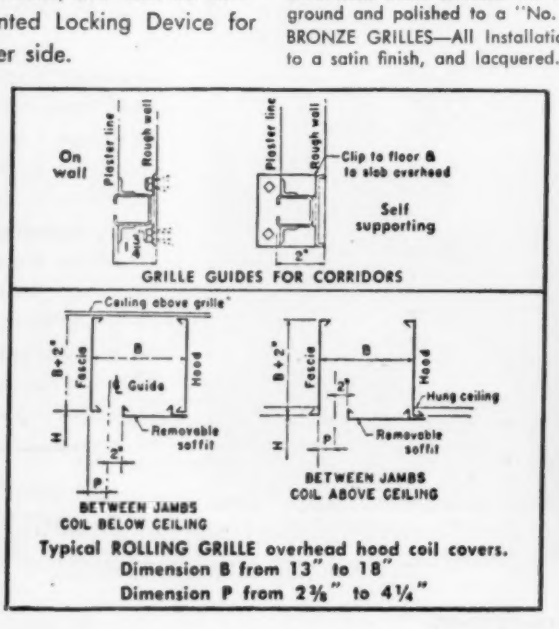
ALUMINUM GRILLES—(A) School corridors and indoor installations. All metal shall be furnished in mill finish. Where appearance is an important factor, all metal shall be brightened by an approved chemical dip. (B) Outdoor installations, Library, and other monumental buildings. All metal shall be brightened by an approved chemical dip, and anodized, or alumilited. (C) De Luxe Installations. All metal shall be mechanically polished and buffed, and alumilited.

STAINLESS STEEL GRILLES—All Installations—All metal shall be mechanically ground and polished to a "No. 4" satin finish.

BRONZE GRILLES—All Installations—All metal shall be mechanically buffed to a satin finish, and lacquered.



DOUBLE FIRE DOORS BETWEEN JAMBS, (shown partially closed)



Typical ROLLING GRILLE overhead hood coil covers.
Dimension B from 13" to 18"
Dimension P from 2⅜" to 4¼"



CORNELL ROLLING GRILLE in school corridor. Side guides and overhead coil are concealed in jambs and ceiling

THE KINNEAR MANUFACTURING CO.

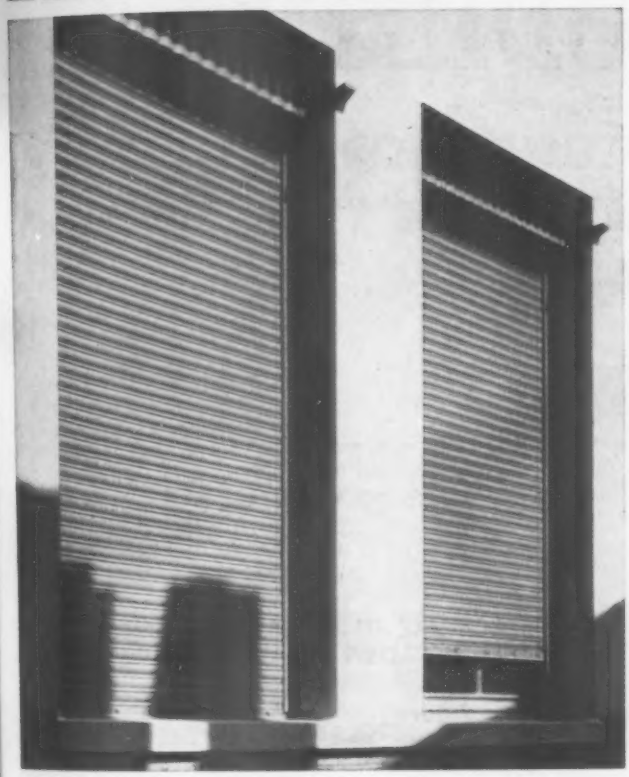
1760–80 Fields Ave., Columbus 16, Ohio

FACTORIES
1760-80 Fields Avenue, Columbus 16, Ohio
1742 Yosemite Avenue, San Francisco 24, Calif.

BRANCH OFFICES in New York, N. Y.; Chicago, Ill.; Boston, Mass.; Philadelphia, Pa.; Detroit, Mich.; New Orleans, La.; Cleveland Ohio; Cincinnati, Ohio; Baltimore, Md.; Pittsburgh, Pa.; and Washington, D. C.

KINNEAR ROLLING DOORS and GRILLES

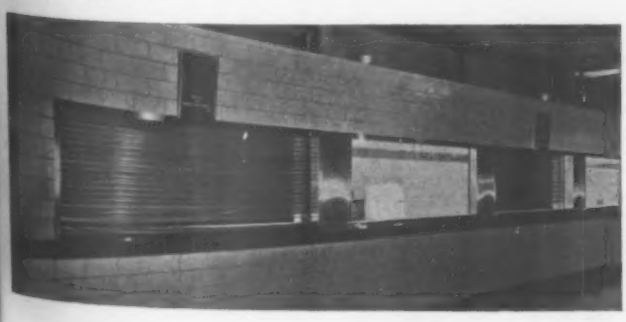
KINNEAR ROLLING DOORS



Underwriters Labeled Fire Doors—Suited also for Service Use

PRODUCTS—Wood or Steel Rolling Service Doors, Automatic Fire Doors and Shutters, Metal Rolling Grilles, Wood Rolling Partitions and Wood or Steel Upward-Acting Doors.

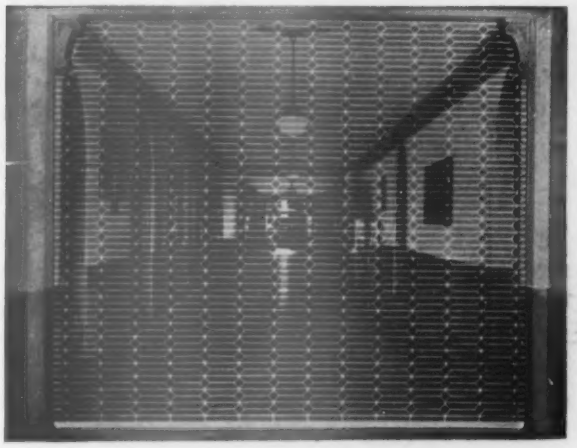
GENERAL—The Kinnear Manufacturing Company pioneered and have devoted their entire effort for the past half century to Rolling or Upward-Acting type Doors and Grilles. They have established the reputation throughout the world as specialists in doors that save floor and wall space, operate more conveniently, reduce maintenance expense through unusual durability and that can be built for old or new buildings for inside or outside use.



Ideal for closing of lunch counters, etc.

Service Doors or Labeled Automatic Fire Doors *for doorways or windows*

Kinnear Rolling Doors are composed of a metal curtain which coils above the lintel, similar to a window shade. They can be installed either on the face of the wall or between the jambs when concealment of the mechanism is desired. Springs provide perfect counterbalance. They can also be operated manually, mechanically, or electrically. Kinnear Fire Doors, though suitable for service purposes, are "labeled" and equipped with mechanism for automatic closure in case of fire. To insure maximum fire protection they are equipped with an auxiliary push-down spring to insure positive closure; a governor for controlling speed of curtain closure; and other features in excess of the requirements of the Underwriters' Laboratories. Their superior design has proved its worth in many major conflagrations.



Grilles for closing corridors to the public

METAL ROLLING GRILLES—Operating on the same principle as the Rolling Door, the Kinnear Rolling Grille is a permanently installed and attractively designed barrier that is remarkably strong when closed and locked, but out of sight when opened. When down, it admits air and light, and does not obstruct vision, making it particularly applicable to all types of interior and exterior openings as well as hallways in school buildings. The grille proper is artistically designed of steel bars spaced close enough to prevent the admittance of large projectiles or a man's hand. The Kinnear Rolling Grille may be mounted on the face of the wall with brackets and coils entirely above the bottom of the lintel and with edges of guides flush with the face of opening jambs; or where headroom is limited and grille cannot be installed on the face of the wall it may be mounted in the opening.

TRUSSBILT

DIVISION OF SIEMS BROS., INC.

2575 Como Avenue, St. Paul 8, Minnesota

TRUSSBILT

TRUSSCORE FLUSH DOORS
HOLLOW METAL BUCKS
FRAMES AND TRIM

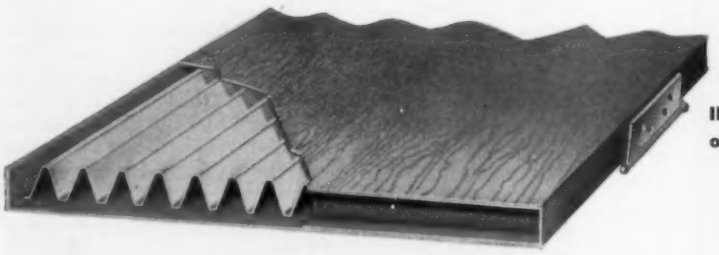


Illustration showing construction of "TRUSSCORE" Flush Steel Door

This Trademark Is A

Guarantee of Quality

After 30 years, still one of the most outstanding improvements in construction of flush steel doors.

WE SPECIALIZE IN REPLACEMENT ENTRANCES OF DURABLE HOLLOW METAL STEEL CONSTRUCTION.

A special message to those interested in quality school construction.

Thirty years ago Trussbilt adapted the principle of rigid truss construction to the manufacture of hollow metal doors. Special assembly and welding equipment was designed to meet exacting manufacturing specifications. The result was an entirely new method of hollow metal construction which produced a door of unusual strength and rigidity. We are proud that today, thirty years later, Trussbilt continuous truss core construction still remains an outstanding feature in the hollow metal door industry.

The fine appearance of Trussbilt flush steel doors combined with their rugged strength and fire resistance, make them especially suitable for fine schools, universities, office buildings, hotels, hospitals and public buildings where hard usage can be expected. The fact that all our products are custom made for each individual project permits considerable flexibility in design so important today.

The designing and manufacturing personnel is composed of men long identified with the Hollow Metal Industry. Any hollow metal problem can be solved in a practical way to attain the most exacting requirements.

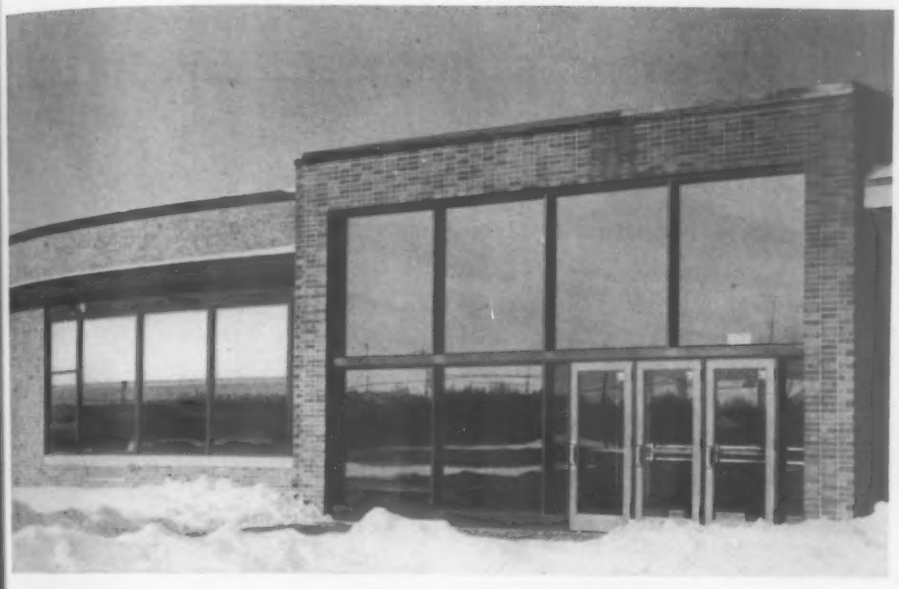
Trussbilt facilities are the most modern and extensive of their particular kind, which makes possible the fabrication of a complete line of hollow metal steel doors, frames, window walls and trim for all types of quality buildings.

Ample capital and experienced executives insure the company's stability and the proper execution of any contract respective of size.

Trussbilt products are guaranteed to be the highest standard of workmanship, material and quality possible.

Complete Catalog will be mailed upon request, or is available in Sweets.

All Products Custom Made



TRUSSBILT

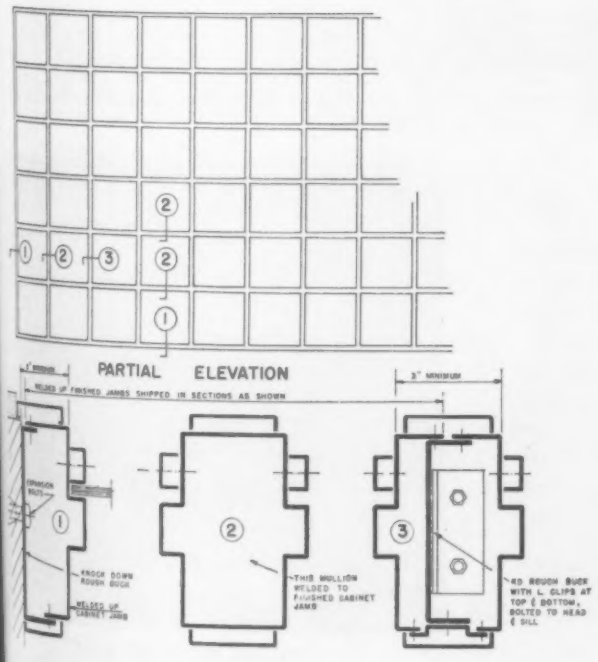
EXTERIOR HOLLOW METAL GLAZED UNITS

Main Entrance, 24′ wide x 13′-6″ high, at Public School, Babbitt, Minnesota. Arthur E. Rowe & Associates, Architect, Lovering-Sweitzer Const., Co., Contractor.

Illustrated on this page are large Hollow Metal openings which can be made to suit the requirements of any building. The details shown are designed for the use of formed metal sub frames; however, the finished jambs can also be adapted to the use of structural sub frames. The selection of sub frames depends entirely on the size of the openings.

The finished jambs are designed so they can be installed in welded up sections thus eliminating the field assembly of many parts and pieces required for knocked down construction.

We invite your inquiries and upon request, we can offer our Engineering service and recommendations.





Stair hall fenestration 38′-6″ high and 10′-0″ wide in Engineering Building, Gonzaga University, Spokane, Washington. John W. Maloney, Architect. Gus J. Bouten Construction Company, Contractor.

NORTH AMERICAN IRON & STEEL CO., INC.

103 58th Street, Brooklyn, N. Y.

NAISCO Overhead DOORS and GRILLES NAISCO

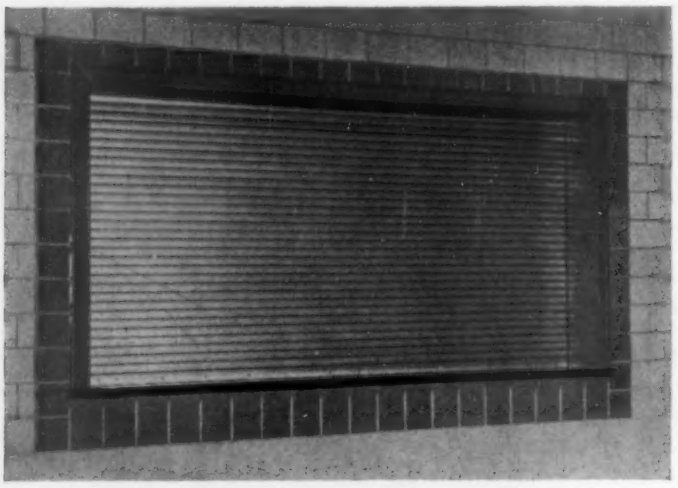
NAISCO products for school buildings include the greatest variety of overhead acting Grilles and Doors. Included are Overhead Rolling Grilles, Overhead Rolling Counter Doors, Overhead Rolling Service and Fire Doors, and NAISCO's Tubular Steel Sectional Overhead Door.

Illustrated at the right is the **NAISCO Overhead Rolling Grille,** ideally suited for isolating sections of the school. This Rolling Grille is attractive in appearance and can be furnished in galvanized steel, aluminum, stainless steel or bronze. Coiling overhead into the hung ceiling this Rolling Grille closes the full height of the passage and yet presents little indication when open during normal class hours. If building construction is such to prevent full concealment in the ceiling, the Grille can be partially concealed in the ceiling, or erected below and housed in a neat enclosure. The Rolling Grille is sturdy and is an efficient barrier. Locking can be arranged for either or both sides and can be master-keyed to the building system.

Rolling Grilles can be erected in an existing building with the hood mounted below the ceiling and the guides on the face of the corridor walls. In most circumstances, no alterations are required.



OVERHEAD ROLLING GRILLE



OVERHEAD ROLLING COUNTER DOOR

The NAISCO flat slat Overhead Rolling Door is a neat and complete closure for counter openings and at storage rooms. The use of this door at kitchen to cafeteria pass windows has become commonplace. The door coils up out of sight on the kitchen side, but remains directly available for quick closing. This curtain is attractive for use at checkrooms; bookroom service; administration desks and at other locations. The door can be fabricated of galvanized steel, aluminum, stainless steel or bronze.

Shown below is the unique **NAISCO Tubular Sectional Overhead Door.** The panels are set flush with the stiles and rails to create a flush panel design blending with contemporary school exterior design and yet retaining the strength and ruggedness of the tubular door. As indicated, maximum glazing is possible. This door is counterbalanced by safe and compactly mounted torsion springs located directly above the opening and not extending into the class or shop room. Panels can be fabricated in steel or aluminum.

In addition to the products illustrated, North American manufactures Flagpoles, Vertical Lift Doors, Canopy Doors, Pier Turnover Doors, Lighting Standards, Railing and Fencing, Ships Parts, Watertight Doors, Booms, and many other items of special metal construction.

Manufacturing since 1913, North American Iron & Steel Co., Inc., has established a reputation for quality, reliability and aptitude for special metal fabrication. In the unique construction industry NAISCO has thrived on fabrication from the creative design of architect and engineer.

NAISCO products are distributed and erected by representatives in principal cities.

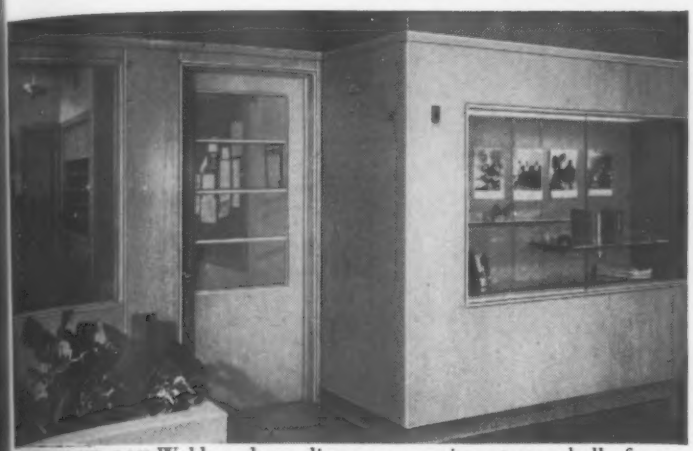
Requests for design data or additional information will receive prompt attention.



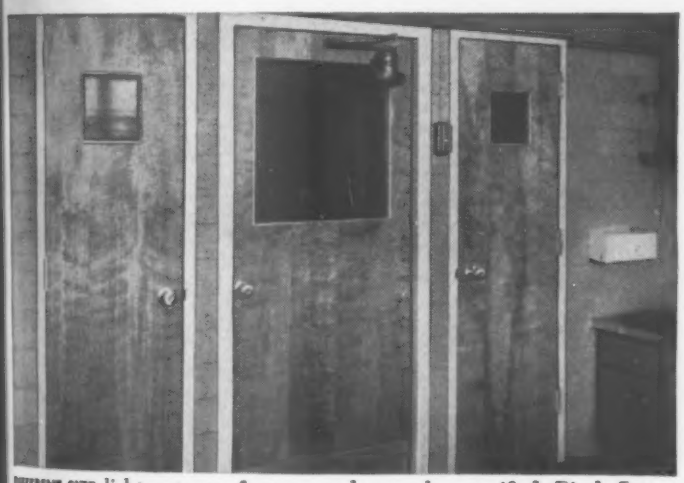
TUBULAR OVERHEAD DOOR

UNITED STATES PLYWOOD CORPORATION

Dept. ASU-55, 55 West 44th St., New York 36, N. Y.



BEAUTIFUL RED OAK Weldwood paneling graces main entrance hall of new Midland School in Rye, N. Y.



DIFFERENT SIZE light cutouts, factory made, can be specified. Birch Stay-Strate Doors in Lake Hiawatha School, Troy Hills, N. J.



PARTITION PANELS can be faced with birch, oak, avodire, elm, gum, mahogany, Korina, walnut, prima vera and many other woods.

HARDWOOD WELDWOOD PANELS

Low first cost Weldwood Plywood is beautifully functional for *every* school location—classrooms, corridors, cafeteria, auditorium, gymnasium.

Low maintenance panels never need painting, never crack or warp.

For inexpensive remodeling. Weldwood panels fit right over existing walls; in new construction, panels are quickly applied over studs. Can be installed *without nails*, using the new Weldwood contact cement.

Weldwood is guaranteed for the *life of the building* in which it is installed.

Fine woods available include oak, birch, walnut, Korina®, Philippine mahogany and many others.

Pre-finished. A wide selection of fine hardwood is now available *factory-finished*, all ready for installation. No on-the-job finishing.

WELDWOOD STAY-STRATE and FIRE* DOORS

WILL NOT WARP—FIRE RESISTANT

Unconditionally guaranteed for the Life of the Installation. Weldwood Stay-Strate Doors are ideal for both interior and exterior use.

Fire resistance of Weldwood Door is due to its incombustible Weldrok® core. Weldrok is an inert mineral material.

Reduces noise. Weldwood Stay-Strate Doors reduce sound transmission about 31 decibels.

Beautiful face veneers offered include oak, birch, walnut, Korina and other fine hardwoods.

Weldwood Fire Door has fire-proofed edge banding as well as Weldrok core. Approved by Underwriters' Laboratories for Class "B" openings in vertical shafts and Class "C" room and corridor openings.

*U. S. Patent No. 2593050

WELDWOOD PARTITION PANELS

Versatile hardwood-faced partition panels simplify subdivision of space in classrooms and offices; can be used as low-railing, 7-foot and full ceiling height partition.

Fire-resistant mineral core is same as used in Weldwood Fire Door.

Sound reduction rating of 37 decibels means the Weldwood Partition is *twice as effective* in cutting noise as 2 x 4 stud partition with metal lath and plaster both sides.

For FREE Booklets and Specifications, write

UNITED STATES PLYWOOD CORPORATION

Dept. ASU-55, 55 West 44th St., New York 36, N. Y.

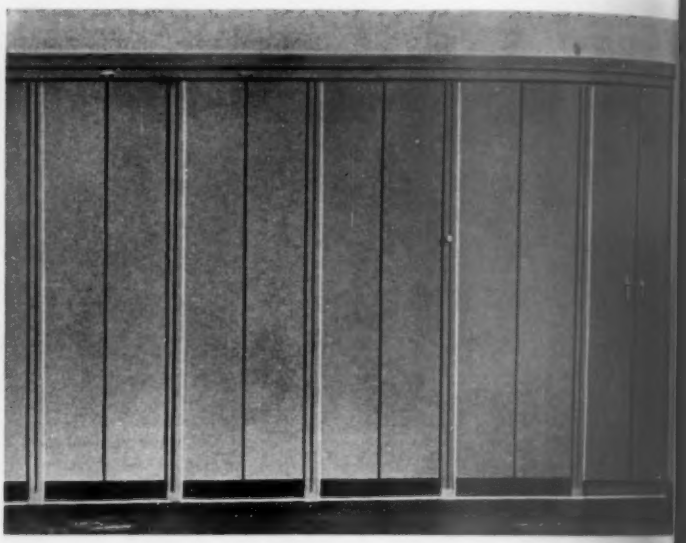
THE INTERIOR STEEL EQUIPMENT CO.

2351 E. 69th Street, Cleveland 4, Ohio

INTERIOR STEEL BUILT-IN CLASSROOM WARDROBES



Showing wardrobe with detail of individual space.



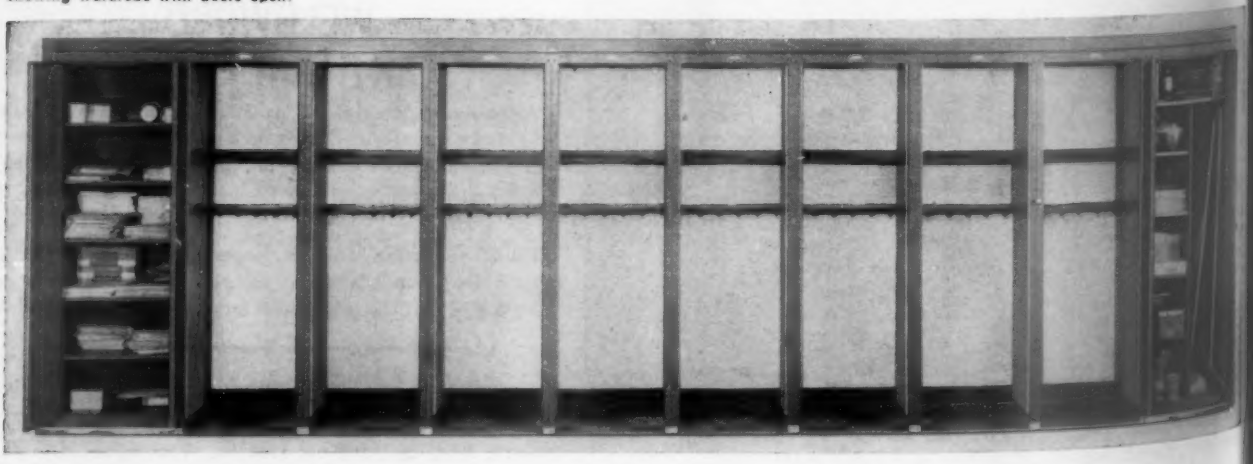
Showing wardrobe with doors open.

Featuring—Automatic Door Closing Control
No Obstructed Aisles
Quiet Operation
Neat Flush Appearance

Interior Steel "Disappearing Door" Pupils' Wardrobes offer the practical solution to architects and school officials for an efficient, safe and sanitary method of housing the clothing of elementary school pupils. Available in two types—Recessed (Type RF) and Non-Recessed (Type NF).

These Wardrobes are designed to afford maximum utility in units 20" wide, to accommodate up to six pupils in each unit. Units can be grouped in any specified number for a particular room. Units can be furnished in any desired combination of Wardrobes and auxiliary cabinets such as Supply Cabinets, or Combination Teachers Cabinets and Bookcases. The hat and coat racks are continuous across the entire Wardrobe. The lower shelf of the rack is provided with six double prong hooks for each unit. Racks can be installed to wall at different heights for different grades. The shelf space on racks is ample for pupil's hats, books or lunch boxes.

Write for literature with complete Specifications.



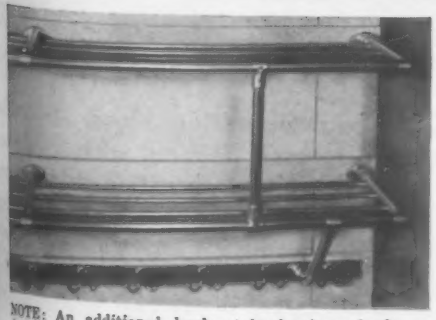
A. R. NELSON COMPANY, INC.

210 East 40th Street, New York 16, N. Y.

A NEW LOW COST WARDROBE

Practical, Easy to Install





NOTE: An additional hook strip having single or double prong hooks staggered 9" on centers can be applied to the front of the lower shelf for more coat capacity.

ARNCO ENGINEERED

• This smart, compact, easy-to-install coat and hat rack . . . which is finely engineered in non-peeling alumilite finish . . . represents the *last word* in practicality . . . especially when combined with the spacious teacher's wardrobe and supply closet and smooth, fire-proof Fiberglas gliding curtaining. For further information regarding this good-looking, space-saving wardrobe. . . . *Write for literature today.*

RICHARDS-WILCOX MFG. CO.
750 Third Street, Aurora, Illinois

R-W Partitions and Wardrobes

Designed for maximu

Better three ways

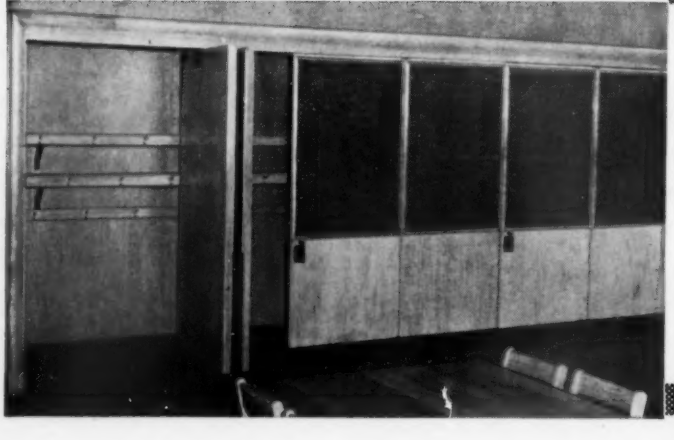
Richards-Wilcox Wardrobe



No. 883 Multiple Operation Wood Wardrobe
—This installation features quick, easy, simulta-neous operation of all doors in the series. Throug an improved design in the top and bottom pivot the pupils' wardrobe doors may be kept in perfe alignment. Heavy top and bottom pivot uni can withstand the hardest usage, keeping th doors working efficiently, noiselessly and smoothly



No. 785 Receding Door Wood Wardrobes—
Pupils' doors, operating individually, slide silentl into the recess with ease. The long offset top an bottom pivots joined together in a single unit b a steel connecting shaft, make the No. 785 pivot arr unit the heaviest, sturdiest and most rigid ward robe operating unit ever produced. No floor track is used, the entryway is completely unobstructed —operation is convenient, easy, practical.



No. 781 Pair Operation Wood Wardrobes—
Doors open in pairs, leaving a free, easily acces sible entryway. Pair operation acts on heavy duty ball bearing floor pivot. Pair operation also protects any writing on chalkboards. Efficient smooth, easy operation. Simplicity of design and precise adjustments make this wardrobe excep tionally easy to install and unusually low in cost

flexibility, convenience and safety

For safe, convenient, practical service, specify

R-W FoldeR-Way Partitions





FOR GYMNASIUMS—R-W Deluxe Fully Automatic FoldeR-Way Partitions—Designed for efficient service in gymnasiums and other large openings, this partition is 100% electric, completely automatic. Opens and closes with a flick of the switch—folds, unfolds, locks, unlocks and soundproofs without requiring any manual assistance.



FOR CLASSROOMS—R-W Manually Operated Sound-Retarding Partitions—In smaller openings, when manual operation is preferred, this partition gives perfect performance. Its method of construction and ease of operation promote complete utilization of all available space — give rooms greater flexibility and adaptability. Installed without floor guides or tracks—permits complete use of floor space. Improves effectiveness by using sound retarding doors having a laboratory tested decibel rating.

Write for further information

1880 RICHARDS WILCOX R-W AURORA TRADE MARK Reg. U. S. Pat. Off. 1955

OVER 75 YEARS

Richards-Wilcox Mfg. Co.

"A HANGER FOR ANY DOOR THAT SLIDES"

AURORA, ILLINOIS, U.S.A. *Branches in all principal cities*

SLIDING DOOR HANGERS & TRACK • FIRE DOORS & FIXTURES • GARAGE DOORS & EQUIPMENT
INDUSTRIAL CONVEYORS & CRANES • SCHOOL WARDROBES & PARTITIONS
ELEVATOR DOOR OPERATING EQUIPMENT

75 years of leadership in door closers

NORTON DOOR CLOSERS

Berrien Springs, Michigan

NORTON DOOR CLOSERS MEET FEDERAL SPECIFICATIONS F.F.-H-121c

NORTON "INADOR" CLOSERS

Modern Streamlined Beauty with all the advantages inherent in Liquid Door Closers! So compact, it fits snugly into a mortise in the top rail of any 1¾" *interior* door, the "Inador" can even be used on 1⅜" doors by making a full cut out of top rail and applying special metal side plates. Nevertheless, it has all the reliability, durability, low maintenance and precision workmanship so characteristic of all Norton Door Closers. For fully illustrated descriptions and engineering data on this and other models, consult the current Norton Catalog.



Write for FREE CATALOG on full Norton line of concealed and surface door closers.



NORTON REGULAR ARM CLOSERS

Every Norton Door Closer is a precision instrument built to last longer under hard service...require less maintenance...provide the long range economies so imperative in all school equipment. Made in 5 sizes for doors of every size and weight. Wide variety of arms to cope with any installation requirements. In addition to regular arm (illustrated), there is also the *Norton Hold-Open* Arm, 90° to 180° parallel arm and fusible link arm...all fully described in the current Norton Catalog. Write for your copy today.

Norton Fusible Link Arm

The fusible link arm, a variation of the regular Norton holder arm, is noted for its simplicity in design and sureness of action as a fire-protection measure. It is approved by the National Board of Fire Underwriters. Norton surface closers are also approved by the Bureau of Standards for Government work under Federal Specifications F.F.-H121c.

LISTED UNDER REEXAMINATION SERVICE UL UNDERWRITERS' LABORATORIES, INC.

Check These Exclusive Norton Features:

- **Rack and Pinion Construction** gives uniform, positive checking at every point!
- **New Aluminum Shell** for lighter weight, robust wear. Proved by use on our surface closers for over 7 years.
- **Non-Gumming, Non-Freezing Hydraulic Fluid** permanently lubricates every inside moving part!
- **Special Spring**—of highest quality steel!
- **Double Adjusting Levers**, easily moved by fingers, control speed of closing action and latching action!
- **Regular Arm Series** and **Holder Arm Series**—the latter especially suited for school use!
- **Famous Guarantee!** For 2 full years, provided recommended sizes are used!

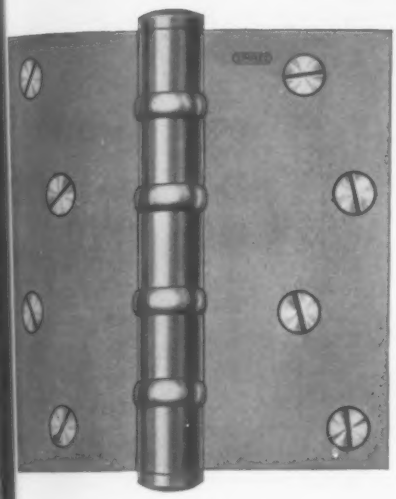
NORTON®

THE STANLEY WORKS

HARDWARE DIVISION

155 Lake St., New Britain, Connecticut

STANLEY *Hinges Recommended for Schools*



FOR EXTERIOR DOORS

TYPE BB 181
Non-template

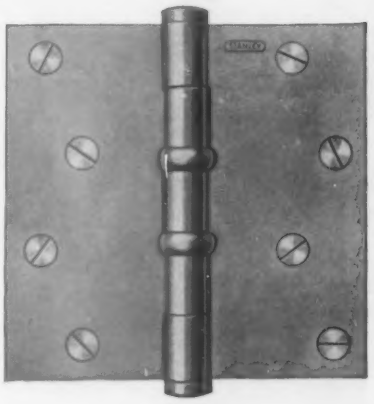
For use on high frequency doors. A Stanley Full Jeweled® Ball Bearing Hinge.

Available in sizes from 4 x 4 to 8 x 8 inches open, in all standard hardware finishes; and with pins non-removable when door is closed, if specified.

The Stanley Full Jeweled Ball Bearing Hinge is the hinge that won't wear out. It lasts for the life of the building — it's the finest heavy duty hinge ever made. In this hinge, the whole load, lateral and downward, is carried by radial thrust bearings.

FOR INTERIOR WOOD DOORS

TYPE BB 239
Non-template



For medium weight doors receiving average frequency use. A Stanley Ball Bearing Hinge.

Available in sizes from 3 x 3 to 6 x 6 inches open, in all standard hardware finishes.



FOR INTERIOR KALAMEIN DOORS

TYPE BB 172 Template

Recommended for medium weight kalamein doors receiving average frequency use.* A Stanley Ball Bearing Hinge.

Available in sizes from 3 to 5 inch length of joint, in all standard hardware finishes.

*For high frequency kalamein doors use Type BB 163.

REMEMBER  THREE HINGES TO A DOOR



This is only a selection from the complete line of Stanley Hardware. Send for your free copy of the Stanley Hinge Guide, 1955 Edition. Write Stanley Hardware, 155 Lake St., New Britain, Connecticut.

STANLEY Hardware



A Division of The Stanley Works
HARDWARE • TOOLS
ELECTRIC TOOLS • STEEL • STEEL STRAPPING

VONNEGUT HARDWARE CO. • VON DUPRIN DIVISION

Indianapolis, Indiana

Von Duprin

COMPLETE EXIT INSTALLATIONS



No. 27B² Exit Device—For the inactive door. No outside hardware—exit only. Drop-forged for greater strength and wear. Crossbar reinforced by full-width X-Bar. Pullman top and bottom latches operate independently.

No. 23B² Exit Device—For the active door. Companion device of 27B². Outside knob locked by outside key. Doors are push-pull with crossbars dogged.

No. 3246—Compensating Meta Astragal—Extruded architectural bronze. Easily adjusted up to ½" to compensate for varying door clearances. Independent operation of each door.

No. 12390 "Latch-Track" Threshold—Extruded architectural bronze. Stumble-proof, ¼" thick stop extends the full width of opening . . . retards wind and water . . . serves as a door stop and latching point.

● For exits that are dependable, attractive and *safe*, always specify Von Duprin exit hardware. The Von Duprin line includes all types of devices and auxiliary items—everything you need for the complete exit installation on any type exit. Check the smart modern style—*all* the quality features in the double-door, vertical rod installation illustrated above.

WHEN YOU SPECIFY Von Duprin devices and accessories, you can be sure of the foremost quality and performance in every item. And you get the *complete* job, ready to go, at one time, in one shipment. Naturally, installation is easier and quicker . . . performance is better. For complete details, contact your Von Duprin "Exit Specialist." If you don't know his name, write:

VONNEGUT HARDWARE CO. • VON DUPRIN DIVISION • INDIANAPOLIS, INDIANA

B-9/GI

GLYNN • JOHNSON corporation

where there's LIFE!



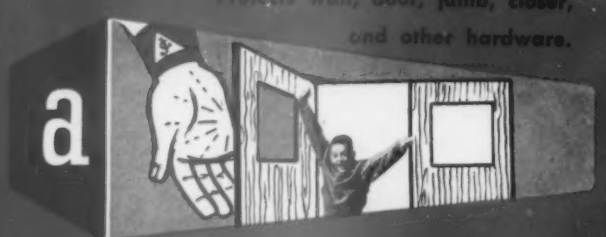
specify GJ hardware for SAFE CONTROL of all SCHOOL DOORS

... eager, exhuberant young people are "on their way" ... much slowing down to remove obstructions like ... the force created by a door heaved open with a hearty ... can be quite destructive if that force is frequently re... and if that force is not put under control or absorbed. ... reveals, hinges, jambs and door closers soon show ... of wear, distortion, and destruction. Excessive mainte... and repair bills are the result.

... GJ door stops and holders were designed to CON... ... free opening action of doors . . . to absorb the ... and noise of sudden stops . . . to keep doors from ... walls and other obstructions . . . and to reduce door ... action by holding the door open when traffic is heavy ... dismissal time.

... door holding and door stopping problem . . . including ... requirements of a limited school budget . . . can be met ... long-wearing, high quality GJ devices shown on the ... pages.

a CUSHIONED STOP for violent openings. Protects wall, door, jamb, closer, and other hardware.



b

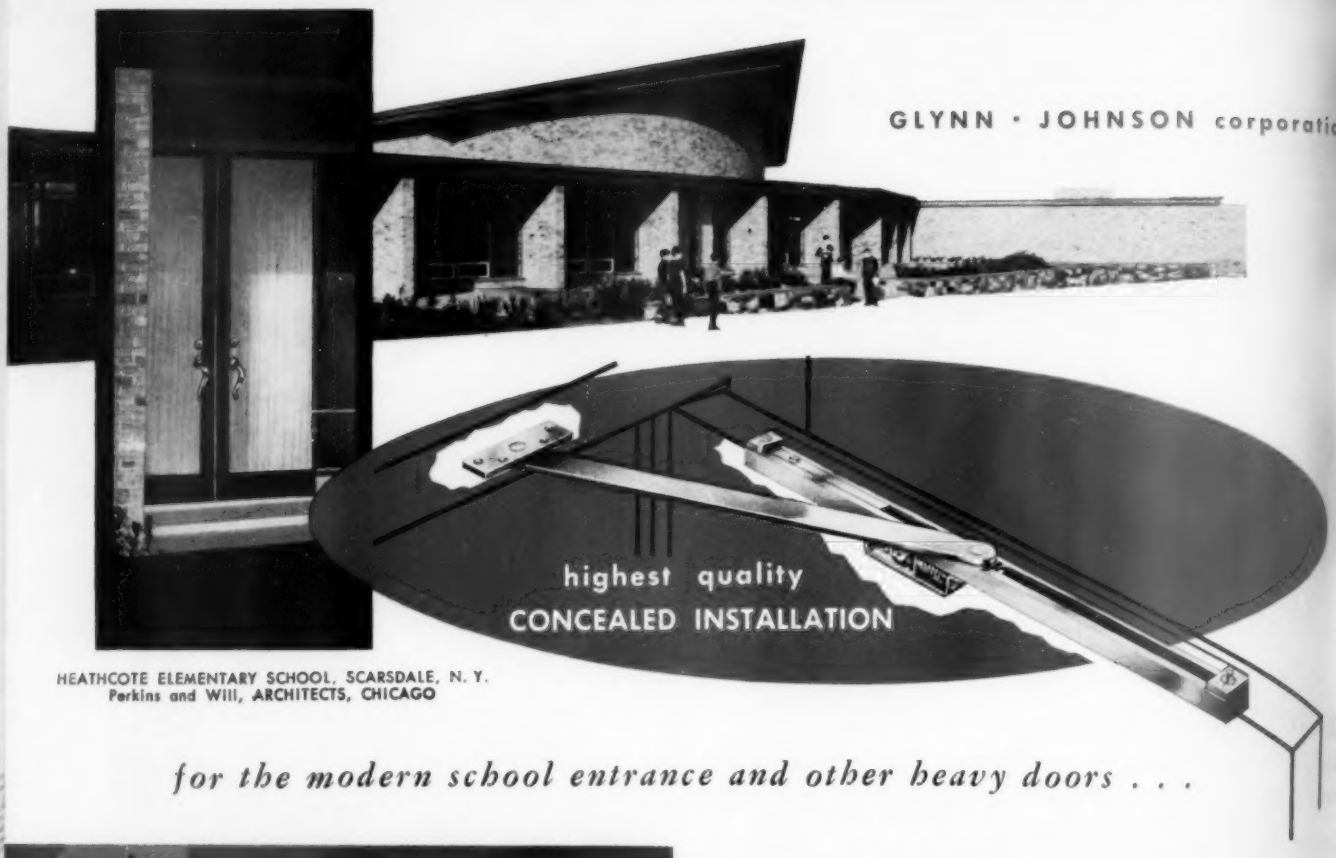


HOLDS THE DOORS at dismissal time . . . eliminates unnecessary wear and abuse.

A. I. A. File No. 27-B

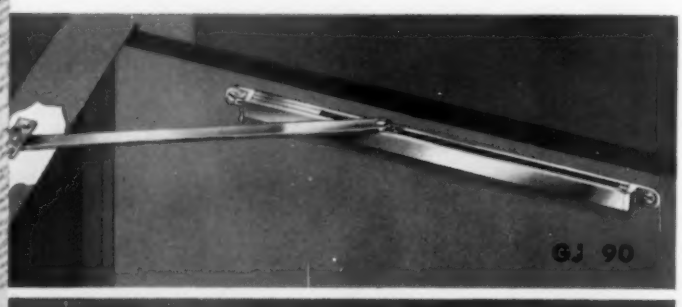
PRODUCERS COUNCIL

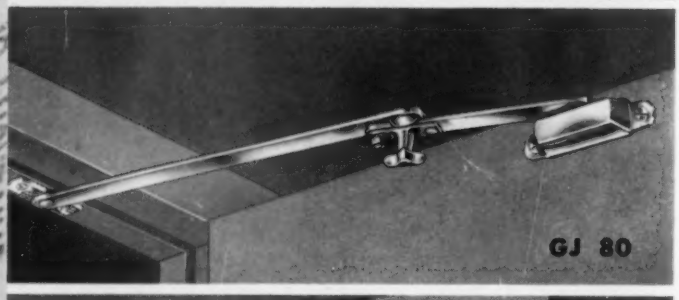
GLYNN · JOHNSON corporation

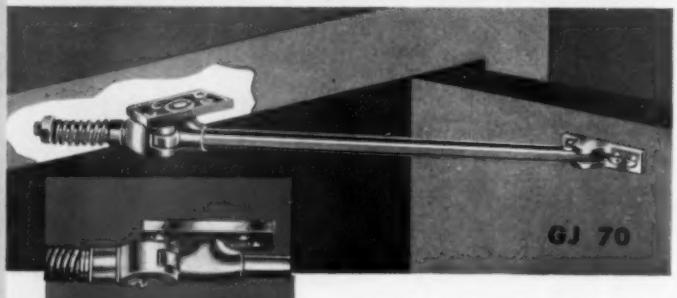


HEATHCOTE ELEMENTARY SCHOOL, SCARSDALE, N. Y.
Perkins and Will, ARCHITECTS, CHICAGO

for the modern school entrance and other heavy doors . . .









with fusible washer

Can be installed in conjunction with surface type door closers.

GJ 100 and 200 concealed overhead door holder, stop, and shock absorber with safety release. For modern single or double acting entrance and vestibule doors. Also gymnasium, auditorium, and all exterior doors. Styles for offset, center hung, and butt hung doors; metal, wood, or all glass. Preferred by architects who strive for the modern appearance achieved by "hidden" hardware.

highest quality SURFACE INSTALLATION

GJ 90 surface type overhead door holder, stop, and shock absorber with safety release. For single acting entrance and vestibule doors. Also gymnasium, auditorium, and all exterior doors. Styles for offset, center hung, and butt hung doors; metal, wood, or all glass. Preferred because it can be installed quickly on new or existing doors.

moderately priced SURFACE INSTALLATION

GJ 80 surface type overhead door holder, stop, and shock absorber with safety release. For single acting gymnasium, auditorium, and classroom doors. Also low cost entrance and vestibule installations. Made in three sizes for different door widths and any type of door hanging. Durably made for practical function in moderate cost installations.

low budget SURFACE INSTALLATION

GJ 70 surface type overhead door holder, stop, and shock absorber with safety release. Can be specified for entrance and vestibule doors where the budget is limited. Also other exterior and interior doors.

Made in four sizes for different door widths and any type of door hanging. A low cost, stout, practical device.

latest details and templates of any GJ device . . . AVAILABLE IMMEDIATELY.



GJ OVERHEAD DEVICES offer the utmost in door control, safety, and protection where doors need not be opened beyond 110°.



Entrance doors, vestibule, stairwell, classroom, and all other doors that have student traffic . . . should have the protective advantages of these overhead door stops and holders. Their resilient spring cushions, with their 5° to 7° "give", comfortably absorb the shock and sound of stopping the door. Being overhead, they are out of the way and offer no stumbling or cleaning hazard or invitation to vandalism. They hold the door automatically and have a SAFETY RELEASE for quick closing in emergency.

The styles shown below are variously recommended for different school doors according to the size and function of the door . . . allowing a variation in selection according to individual preferences and school building budgets. They are all manufactured of high tensile strength bronze alloys in all standard finishes.

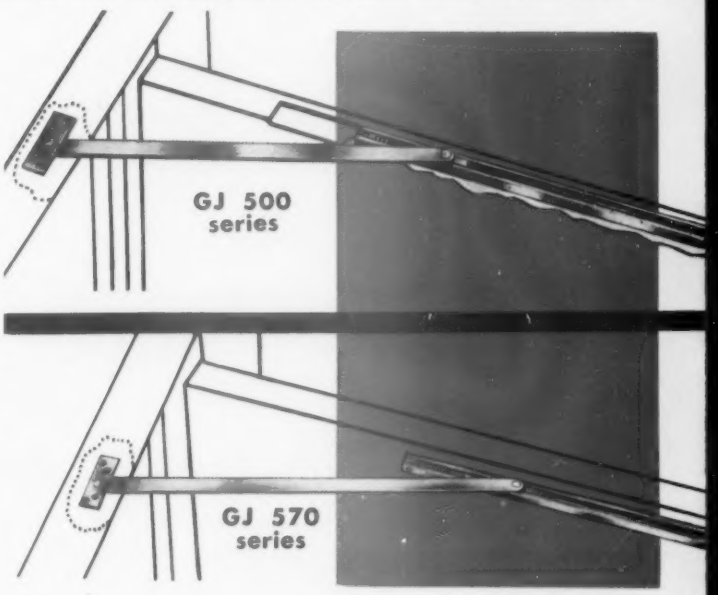
CLASSROOM DOORS and other interior doors should have protection of safe overhead control . . .

Overhead holders are out of the way and cannot be tampered with or cause accidents.

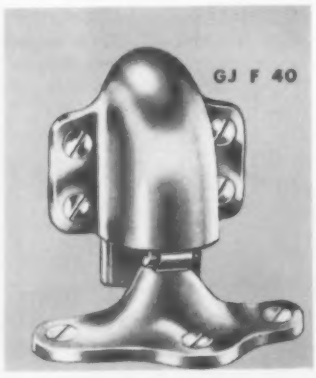
GJ 500 series • CONCEALED INSTALLATION

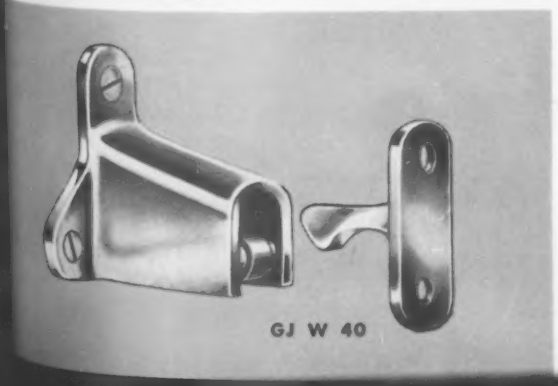
GJ 570 series • SURFACE INSTALLATION

The door is held open and released by a simple push and pull action. The resilient cushioned door stop with its 5° to 7° give absorbs the shock and sound of violent door openings. Made in four sizes for doors of different widths and all styles of door hangings . . . single or double acting. Non-handed.









FLOOR and WALL TYPE door holders and bumpers

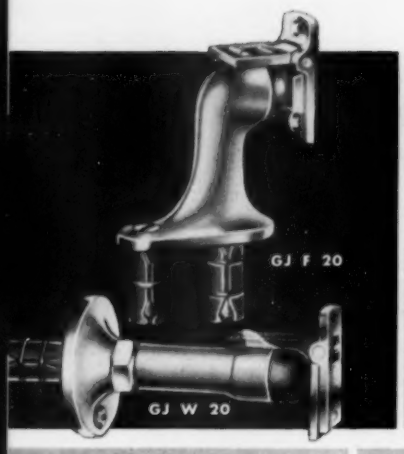
for doors opening to a complete 180°

for ENTRANCE DOORS and other exterior doors.

GJ F 9 floor type semi-automatic, functioning as bumper and holder. Hook attached to door slides under engagement tongue and holds until released by pushing door back. Where doors are extra large, the heavier GJ F 10 is recommended.

for CLASSROOM DOORS and other interior doors.

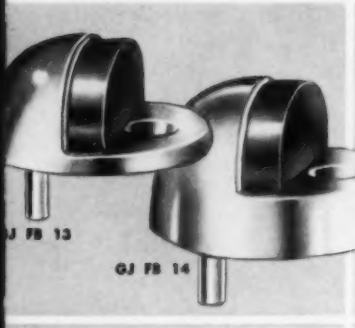
GJ F 40 floor installed. GJ W 40 wall installed. Quiet operating bumpers with push-pull holder and release. Fool proof. Engage on contact, releases by firm pull. The rounded edges prevent children from riding or standing on the holder. The most widely used bumper-holders in school installation.

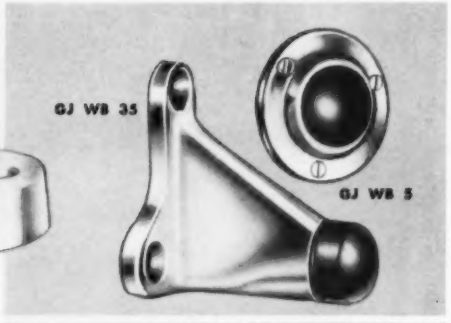


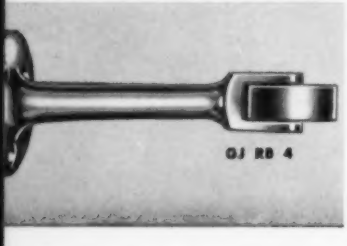


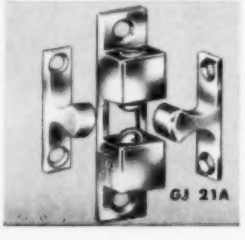














floor and wall type

door bumpers with holders

GJ F 20 floor installed. GJ W 20 wall installed. Holder and bumper with strike plate hook. Hook is flipped up to engage door. When disengaged, hook falls and "locks" into strike plate.

floor type door holders

Recommended where traffic is light and a door stop is not required. Attached to base of door, holds door open at any position. Rubber shoes grip firmly.

GJ 4 lever action. Highest quality bronze in various finishes and sizes. Also GJ 44 and GJ 444 for lower budget.

GJ 1153 (aluminum) • GJ 1154 (bronze or brass) plunger action. Contact and spring trigger release by foot. Available in all finishes.

floor and wall type bumpers

GJ FB 18 • GJ FB 19 floor type door stops and bumpers. In heights 2⅛" and 2⅞" and for mounting with wood screws or expansion shields. Solid rubber tip.

GJ BP 1 floor type door stop with plunger cushion for absorbing shock. Securely anchored into floor. Heavily built. Furnished with strike plate for door.

GJ BP 2 wall type stop with plunger cushion.

GJ FB 13 • GJ FB 14 dome type door stops and bumpers, floor mounted. Styles adapted to installations without or with thresholds for wood screw, machine screw or expansion shield mounting.

GJ WB 35 extended wall type door stops and bumpers, 2¾" long with sloping top. All available for either wood screw or expansion bolt installation.

GJ WB 5 flush type wall bumpers to protect knobs, wall and reveals. Available from 1" to 4" diameter, and from 9/16" to 1" projection . . . for screw or toggle mounting. Brass or bronze.

GJ RB 4 roller bumpers. Prevent two interfering doors from striking or their knobs from locking.

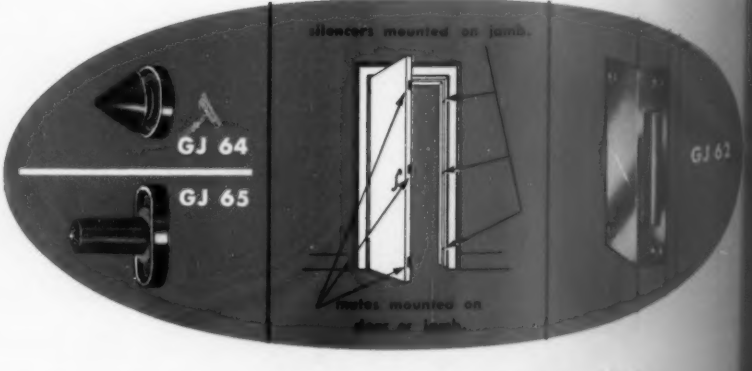
GJ 21A four way catch and GJ 22 two way catch. Ideal for cabinet, wardrobe, and sliding doors. One permanent installation—no repairs or replacement. Ball under spring pressure "pulls" sagging doors into line.

for quiet **DOOR CLOSING . . .**

GJ silencers and mutes hush the noise of slamming doors.

GJ 64 and GJ 65 rubber door silencers
Inexpensive, pneumatic cushions—GJ 64 installed in metal frames, GJ 65 in wood frames—absorbs shock and noise of door closing and eliminates lock rattle.

GJ 62 mutes. Recommended for doors having no door closers. Noise and force of severe slams absorbed, reducing noise and destructive shock.



For further help in specifying or ordering see your local GJ Contract Hardware Dealer and Hardware Consultant or write direct.

GLYNN • JOHNSON CORPORATION
4422 north ravenswood avenue • chicago 40, illinois

Printed in U.S.A.

B-9/8J

for the modern school, specify

RIXSON concealed DOOR CLOSERS

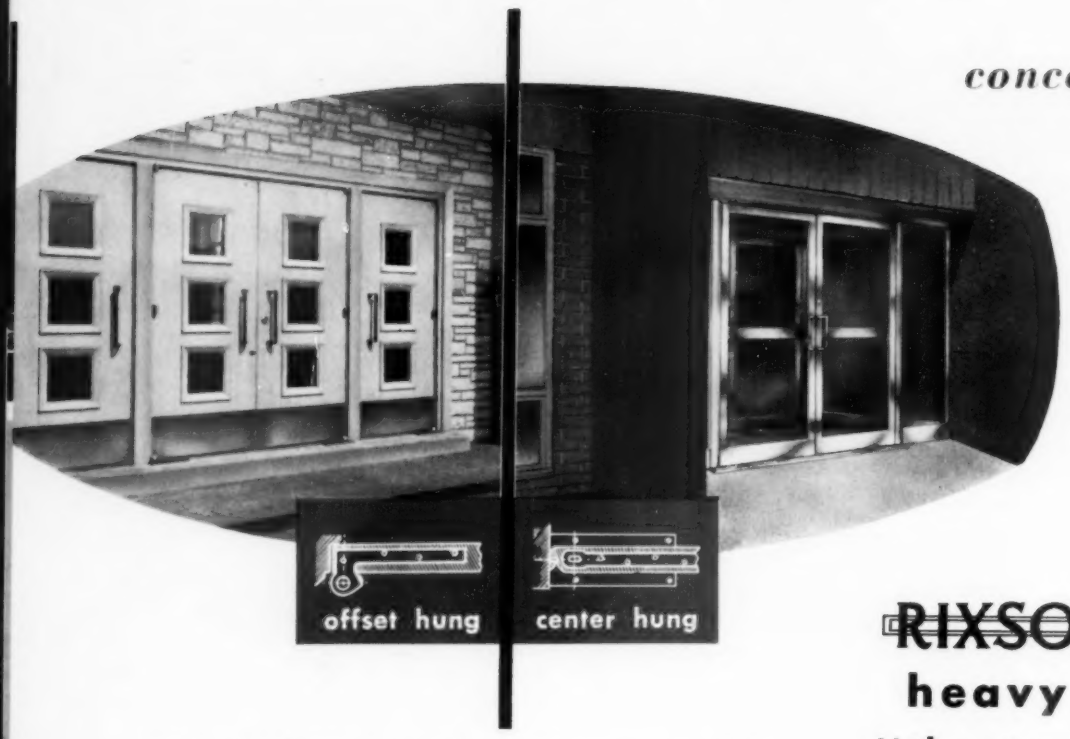
for entrance and vestibule doors
and all interior room doors...



conceal the closer and expose the beauty of the door

floor type closers are firmly installed in the sub-floor

conceal the closer an



for MODERN entrance doors and vestibule doors these heavy duty closers are preferred:

single acting doors: no. 25 offset hung • no. 26 center hung • no. 326 butt hung.

double acting doors: no. 40 center hung.

for schools with lighter entrance doors not over 2' 10" wide these smaller closers are often used:

single acting doors: no. 20 offset hung • no. 21 center hung • no. 321 butt hung.

double acting doors: no. 30 center hung.

for MODERN Stairwell, Auditorium, Gymnasium, and Cafeteria entrance doors:

single acting doors not over 3' 6" wide: no. 20 offset hung • no. 21 center hung • no. 321 butt hung.

single acting doors under 3' wide: no. 18 offset hung no. 18½ center hung • no. 318½ butt hung.

double acting doors: no. 30 for doors not over 3' 6" wide no. 40 for larger, heavier doors.

RIXSON floor type heavy duty closers

"the strongest of them all"

FIRMLY INSTALLED in the RIGID FLOOR

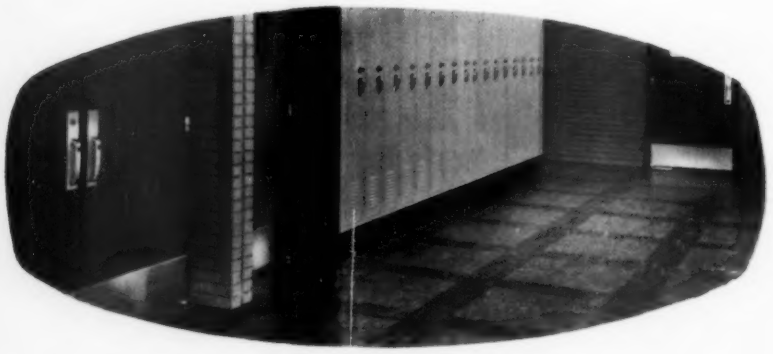
Allows full opening of door—no obstructions.

Will not gather dust or dirt. Cannot be tampered with.

SELECTIVE BUILT-IN HOLD-OPEN

Available in all Heavy Duty Closers except Nos. 18, 18½ and 318½.

A Selective Hold-open will be built in at the factory to hold the door at a predetermined degree of opening. Just specify "with selective hold-open" and degree door is to be held. When the selector is set at hold-open, the door is held when it reaches the hold-open position. When "selector" is set out of hold-open the closer functions normally to bring the door to a quiet close after each opening.



The **single acting UNI-CHECK** is widely used for modern classroom doors. Also office, toilet room and other interior doors.

The **DUO-CHECK** meets the requirement of some cities for double acting classroom doors. They are also used for cafeteria and kitchen doors.

RIXSON floor type closers for interior doors

FIRMLY INSTALLED in the RIGID FLOOR

Allow trim, neat, modern appearing corridors showing no unsightly devices.

Eliminate the hazards of accidents and tampering. No exposed arms or mechanism to gather dust or dirt.

Cost no more for over-all installation . . . offer longer wear with minimum maintenance.

built-in hold-open available on both UNI-CHECKS and DUO-CHECKS

A hold-open is built in at the factory. Just specify "with hold-open" when ordering.

expose the beauty of the door



every school door should be under the *safe control* of a RIXSON closer

For SAFE CONTROL of school doors . . . the closers must be designed for extremes of usage. The resistance to the opening action must be sufficiently gentle so that even a frail child can open the door easily. Yet that resistance must also retain complete control of the door when the "line plunging" youngster goes into action.

Rixson Closers are ruggedly built by precision methods to meet these dual requirements . . . gently and firmly bringing the door to a quiet rest at closed position. Specify RIXSON throughout. There's a RIXSON Closer to suit every exterior and interior door requirement.

SINGLE ACTING • offset type
no. 18 • no. 20 • no. 25 (handed)

Entire weight of door is carried on the spindle supported by ten 9/32" chrome steel Ball Bearings. A top pivot (and on heavy or wide doors, a side jamb pivot) keeps the door in alignment.

Single acting closers nos. 318½ • 321 • 326 available for use with standard hinges.

SINGLE ACTING • center hung
no. 18½ • no. 21 • no. 26 (handed)

No hardware shows on this completely concealed type of installation. Widely used on battery of doors with no mullions . . . effecting an economy of space. The two larger sizes available for glass door installations.

DOUBLE ACTING • center hung
no. 30 • no. 40

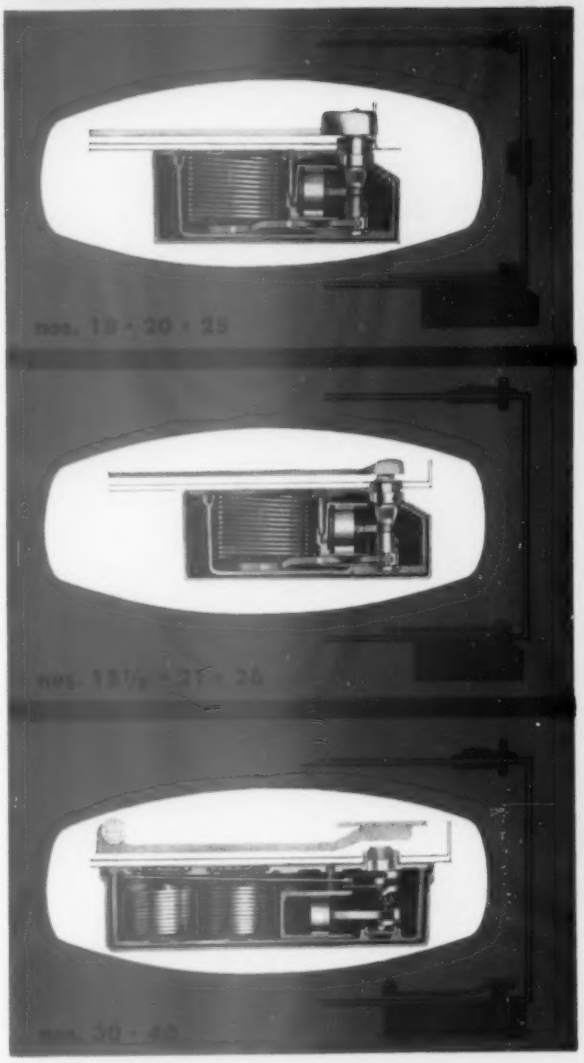
For doors swinging both ways. Hardware completely concealed. Double springs and double hydraulic cylinders make it completely adjustable to varying "in and out" wind and air conditioning problems. Also available for glass doors.

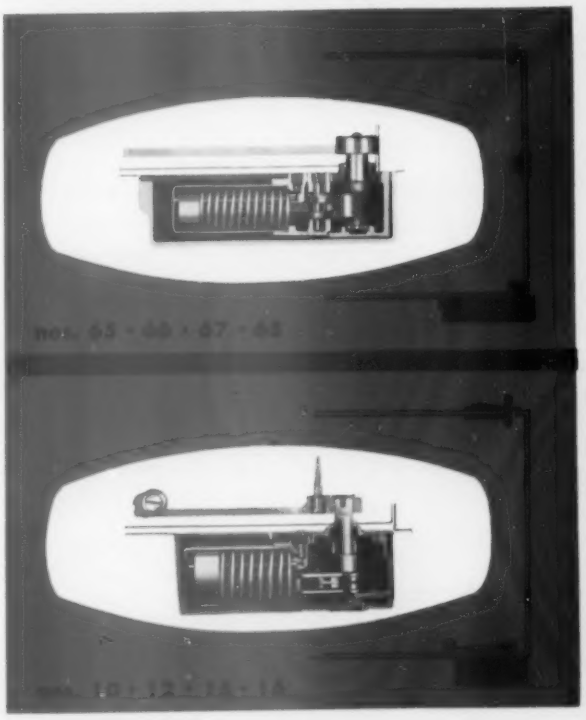
SINGLE ACTING • offset type
UNI-CHECK • nos. 65 • 66 • 67 • 68

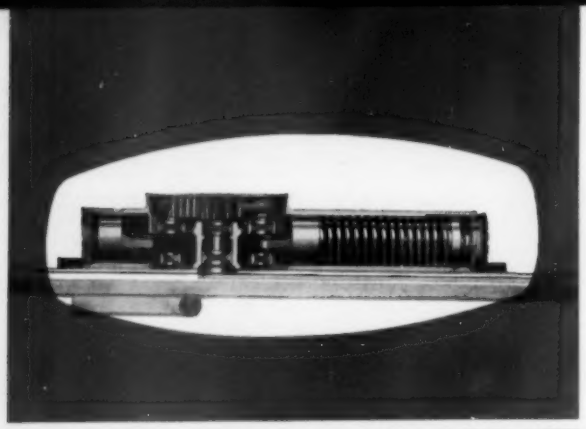
The modern concealed checking device for interior doors. Gentle, uniform, silent closing action. Supplied with built-in hold-open if desired. Requires small floor area . . . only 2 9/16" deep. Ruggedly built for long, continuous, trouble-free action.

DOUBLE ACTING • center hung
DUO-CHECK • nos. 10 • 12 • 15 • 16

For interior doors swinging both ways. Completely concealed . . . allows a trim, neat, modern appearance. Requires very little floor area or depth. Available with automatic hold-open if desired.







where ***OVERHEAD installations are necessary***

RIXSON nos. 218½ • 221 • 226 for center hung installations and nos. 218 • 220 • 225 for doors hung on hinges.

Each a compact powerhouse, only 2⅞″ wide x 2¼″ high x 17″ long. Ideal where head jamb is shallow and narrow.

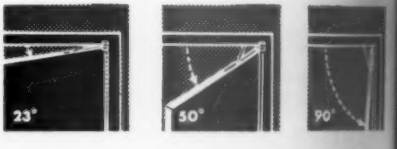
For entrance and vestibule doors nos. 225 and 226 are recommended when overhead closers are specified. Nos. 220 and 221 widely specified for stairwell doors, gymnasium, and auditorium doors. Nos. 218 and 218½ often used to control classroom and office doors as well as toilet room doors.



AUTOMATIC 3 point HOLD-OPEN for classroom doors...

RIXSON no. 37 DOOR HOLDER

holds the door open automatically at 23°, 50°, and 90°



Used with the RIXSON UNI-CHECK closer . . . makes the ideal door control combination for classroom doors. Holder quietly released by a sharp push of the door, either way. Write for full description and details.

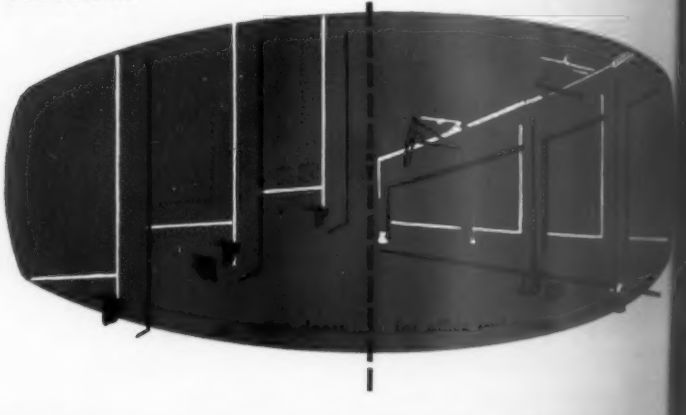
RIXSON no. 350

single and double acting checking pivot hinges



Closes office rail gates automatically—no flip-flap. Brings gate to a quiet rest at closed position. Eliminates noise of free swinging. Available in a variety of pivots, arms, and brackets to suit any style of office rail installation.

For safe control of lavatory stall doors. Prevents violent swinging or slamming of doors. Can be set to bring door to a closed position—or to hold door ajar when not latched.



THE OSCAR C. RIXSON CO.

9100 w. belmont ave. • franklin park, illinois

Write direct for complete templates or contact your local RIXSON repres

originators of floor type door closers

RIXSON

. . . quality hardware for 55 years.

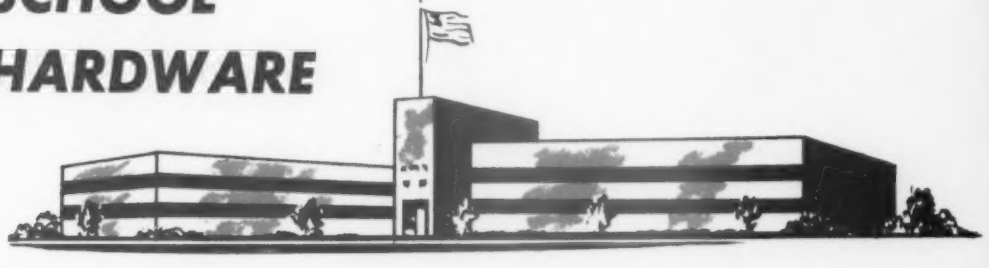
LOS ANGELES, CALIF.	Russell and Whiteside, 5311 E. Beverly Blvd., P.O. Box 6732, Phone: Raymond
SAN FRANCISCO, CALIF.	John P. Whitty, 1030 Arlington Blvd., El Cerrito, Phone: Landscape
DENVER, COLO.	Lyle C. Hewett, 1608 Broadway, Phone: Keystone
ATLANTA, GA.	Glenn D. Robertson, 4210 Club Drive, N.E., Phone: Exchange
CHICAGO, ILL.	Wm. A. Klaff, 210 Circle Ave., Forest Park, Ill., Phone: Forest
DOWNERS GROVE, ILL.	H. G. Neise, 5616 Aubrey Terrace, Phone: Downers Grove
NEW ORLEANS, LA.	Harold V. Toop, 426 Russell Ave., Long Beach, Miss., Phone:
BOSTON, MASS.	Kenneth H. Bullard, 15 Boylston Place, Brookline 47, Mass., Phone: Aspinwall
ST. PAUL, MINN.	Roland H. Gedatus, 1333 Delaware Ave., Phone: Capitol
NEW YORK, N. Y.	Fred G. MacKenzie, 107 Reade St., Phone: Barclay
SYRACUSE, N. Y.	T. E. Davidson, West Genesee Turnpike, Camillus R.F.D. 2, New York; Box 443, Phone: Syracuse
CLEVELAND, OHIO	K. A. Klaasse, 364 Lake Forrest Drive, Bay Village, Phone: Trinity
PHILADELPHIA, PA.	G. Norris Williams, 211 Greenwood Ave., Wyncote, Pa., Phone: Ogontz
DALLAS, TEXAS	R. M. Schneider, 4633 Rockaway Drive, Phone: Taylor
SEATTLE, WASH.	S. G. Kirkland, 845 Bellevue Ave., N., Phone: Elliott
WASHINGTON, D. C.	Lloyd R. Anderson, 4318 Rosedale Ave., Bethesda, Md., Phone: Oliver
TORONTO, CANADA	K. M. Thomas Company, 410 Bloor St., East, Phone: Walnut
HONOLULU, T. H.	B. F. Schoen, Ltd., P.O. Box 3464, Phone:

B-9/Ya

YALE ALUMINUM



SCHOOL HARDWARE



In the long trend from the little red schoolhouse of yesterday to the modern school, architecture has emphasized the combination of function and beauty.

Yale design has kept pace with this trend by stressing these same two qualities. As a result YALE & TOWNE School Hardware embodies a functional excellence and a simple beauty which is entirely in keeping with the modern school structure.



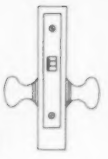
YALE MORTISE LOCKS and LATCHES



STANDARDIZED MORTISE LATCH
Front: 8" x 1¼"
Backset: 2¾"
Case: 5¾" x 3⅞" x ¾"

A.

8000 PASSAGE LATCH
Government Type No. 86N



Operation—Plain latch bolt by knob from both sides.

A1.

8032 FIRE EXIT LATCH
Government Type No. 87N



Operation—Deadlocking latch bolt by knob inside only. The bolt has ½ inch throw when door is open; the action of closing the door causes the second throw to project, thus giving the bolt a throw of ¾ inch when door is closed. Suitable for doors to fire escapes.

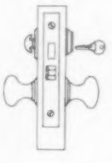
A2.



STANDARDIZED MORTISE LOCK
Front: 8" x 1¼"
Backset: 2¾"
Case: 5¾" x 3⅞" x ¾"

B.

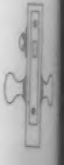
8660 UTILITY, CLOSET OR PASSAGE LOCK
Government Type No. 86B



Operation—Latch bolt by knob from both sides. Dead bolt by key from outside, by turn knob from inside.

B1.

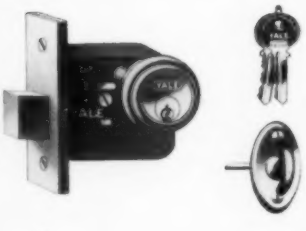
8535 BATHROOM LOCK SET
Government Type No. 86L



Operation—Deadbolt by turn knob from inside only.

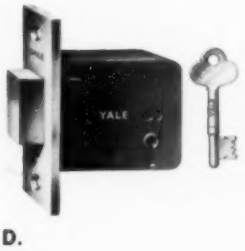
B2.

YALE DEADLOCKS



C.

325 DEADLOCK
Government
Type No. 190K
Front: 4" x 1⅛"
Backset: 2½". Also 2¾"
Case: 2½" x 3⅝" x 1⅜"



D.

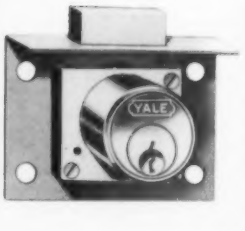
297 ASYLUM MORTISE DEADLOCK
Front: 5¼" x 1⅛"
Backset: 2¾"
Case: 2⅞" x 3½" x 1⅜"



E.

278 ASYLUM MORTISE DEADLOCK
(278 with standardized cable —Govt. Type No. 192)
Front: 5½" x 1¼"
Backset: 3"
Case: 3" x 4⅛" x ⅞"

YALE DOOR, DRAWER and CABINET LOCKS



5591

3-WAY DESK AND CABINET LOCK
PIN TUMBLERS
Government Type No. 910

Same lock can be used in three different positions. Changed from drawer lock to right or left hand by releasing a catch and rotating cylinder.
Application: Half Mortise. For ⅞", 1⅛" or 1⅜" wood or metal drawers and cabinets.
Operation: Deadbolt.
Material: Brass — Available with satin chrome plated face and cylinder to blend with other aluminum hardware.



8648
UTILITY, CLOSET OR EXIT LOCK
Government Type No. 86EW



Operation—Deadlocking latch bolt knob from inside only. No stop work in front. Outer knob is pinned fast and serves as pull in closing door. Latch bolt is retracted by key from outside. Bolt can always be retracted by key from outside or knob from inside.

A3.

8737-¼
FIRE EXIT LOCK
Government Type No. 87G



Operation—Deadlocking latch bolt with ¾ inch throw by knob from both sides except when outside knob is set by key through inside cylinder. When outside knob is stopped, bolt can be operated by key only from outside and knob from inside. Bolt always can be retracted by key from outside or knob from inside.

A4.

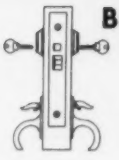
8656
OFFICE OR EXIT LOCK
Government Type No. 86E



Operation—Deadlocking latch bolt by knob from both sides except when outside knob is set by stop in front. When outside knob is stopped, bolt can be operated by key only from outside, and knob from inside. Bolt can always be retracted by key from outside or knob from inside.

A5.

8426-¼
ENTRANCE HANDLE LOCK

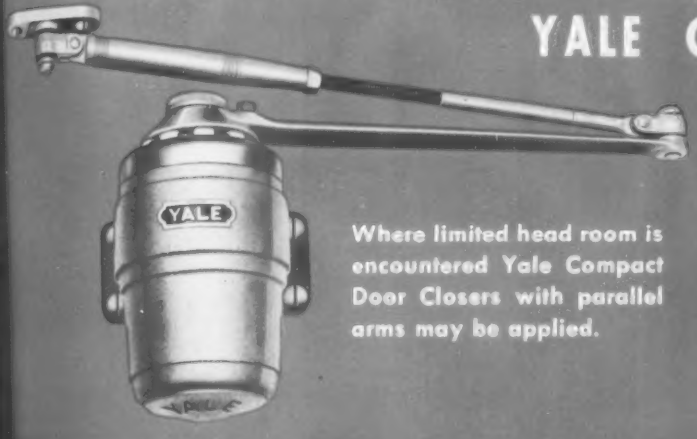


Operation—Deadlocking latch bolt outside by key at all times and by thumb-piece except when thumb-piece is deadlocked by key through inside cylinder. Inside by thumb-piece at all times.

A6.

YALE COMPACT DOOR CLOSERS

Specially designed for SCHOOL USE



PARALLEL ARM DOOR CLOSER

Where limited head room is encountered Yale Compact Door Closers with parallel arms may be applied.

Yale Compact Door Closers are designed for every application where quick, quiet, automatic closing of school doors is desired.

To harmonize with the aluminum hardware, the Compact Closers are similarly finished in aluminum.



Inconspicuous, attractive in appearance, the Yale Compact Series of Closers is engineered for years of hard service under all operating conditions.

REGULAR DOOR CLOSER



For fire doors Yale Fusible Link Closers are an important safety measure.

They are listed by Underwriters' Laboratories.

FUSIBLE LINK DOOR CLOSER

WA120

CABINET LOCK
LEVER TUMBLER
Size: 2" x 1⅝"
Backset: 1⅜"
Throw: ⅝"

Reversible right and left.
Material: Brass with heavy brass bolt. Available with satin chrome plated finish to match aluminum hardware.

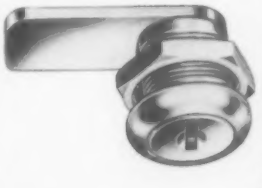
611



CABINET LOCK
PIN TUMBLER
Government
Type No. 957
Size: 2" x 1⅝"
Cylinder: 1⅛" dia.
Backset: 1⅜"
Throw: 1"

Material: All brass. Available with satin chrome plated finish to match aluminum hardware.

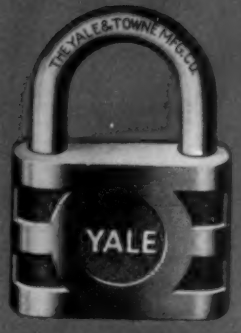
F6100



UTILITY CAM LOCKS

These locks are available in a wide range of sizes with a variety of cam shapes to suit different applications. They are used for metal doors drawers, cabinets and lockers of many different types. Available fitted with a stainless steel scalp to blend with aluminum hardware.

YALE PIN TUMBLER PADLOCKS



840

SUPER PIN TUMBLER PADLOCK

Highest Security — Can Be Master Keyed with other locks which have the same key number. Shackle is case hardened steel. Case is forged brass and polished



774

HIGH GRADE PIN TUMBLER PADLOCK Government Type No. EPB

Heavy Duty Security. Solid brass case. Shackle of case hardened steel. Phosphor bronze spring

YALE COMBINATION LOCKER LOCKS and PADLOCKS

589



YALE COMBINATION PADLOCK

Dial and Key Operation: The knob is turned to the right after the last number has been dialed. Closing the shackle automatically deadlocks the bolt and disperses all three tumblers.

Specifications: Body—A die cast unit. Shackle clearance 1". Shackle securely held at heel and deadlocked by hardened steel bolt at toe end.

L3374



LOCKER LOCK FOR LOCKERS WITH AUTOMATIC LATCHING DEVICE

Dial and Key Operation: Combined dial and control key operation eliminates need for consulting records in emergencies or for periodic inspections. All locks in an installation are set to different combinations. Each lock can be changed to 12 different combination settings without removal from the door.

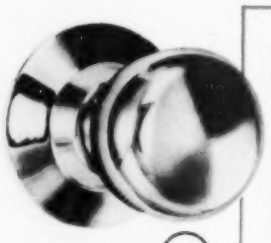
L3378



LOCKER LOCK FOR STEEL GRAVITY OR MANUALLY OPERATED LOCKERS (⅜" Max. Door Thickness)

Dial and Key Operation: Control key [illegible] time and [illegible] combinations are possible unlimited. Any person can change combination as often as necessary. [illegible] 12 different combination settings.

NEW 5300 SERIES YALE CYLINDRICAL LOCKSET

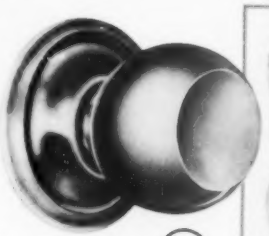


Design Symbol (LF)

LITCHFIELD

Available in wrought brass, bronze and aluminum.





Design Symbol (CL)

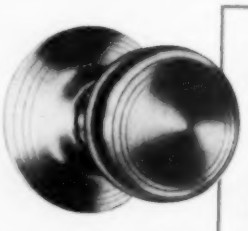
CLASSIC

Available in cast brass, bronze and aluminum.



Yale Engineering has incorporated the most modern time-and-trouble-saving features in these locksets. Each lock is "function-fitted", tailored in its operation to the use of the door on which it belongs.

Fingertip push button locking and turn button locking eliminate fuss and fumble. Key-in-knob design facilitates locating keyhole—permits unlocking and opening with a single motion of one hand.

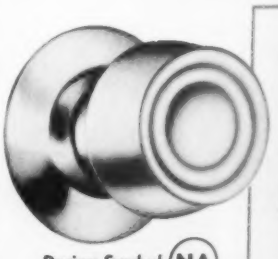


Design Symbol (TR)

TROY

Available in wrought brass, bronze and aluminum.





Design Symbol (NA)

NASSAU

Available in cast brass, bronze and aluminum.



For detailed information on Yale hardware call your local Yale hardware distributor.

YALE & TOWNE

Yale Lock & Hardware Division
YALE & TOWNE MFG. CO.
Stamford, Conn.

THE MICHAELS ART BRONZE CO., INC.

P.O. Box 668-AS, Covington, Ky.

PRODUCTS

Bronze and Aluminum Tablets and Signs • Bronze Doors and Casement Windows • Name Plates • Office and Lighting Fixtures • Bulletin Boards • Building Directories • Railings • Desk Sets • Lamp Standards • Grilles and Wickets • Radiator Grilles • Kick and

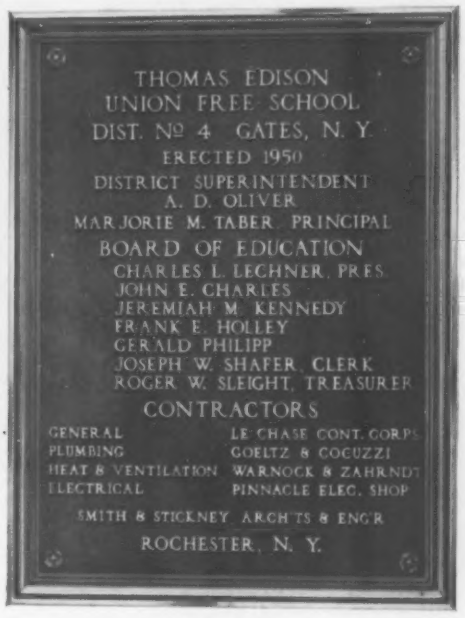


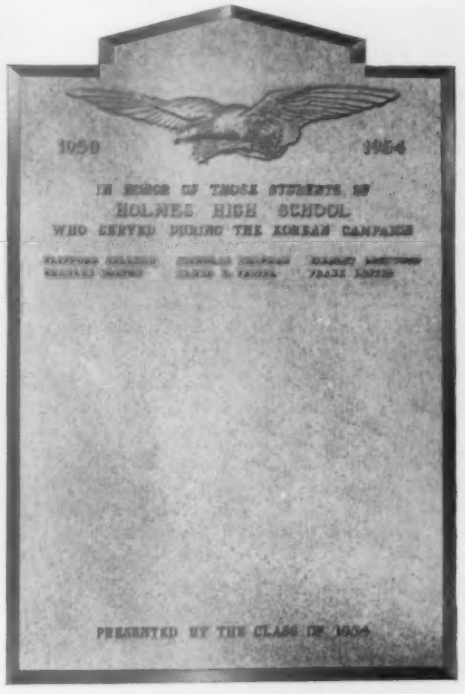
PRODUCTS

Push Plates • Push Bars • Astragals • Time-Tight Exhibit Cases • MI-CO Parking Meters • Cast and Extruded Thresholds • Wire Work (Partitions, etc.) • Marquees, and many other ferrous and non-ferrous metal products.

Michaels Bronze and Aluminum Tablets and Signs are manufactured in a wide range of designs, shapes and sizes to meet all school and college requirements. A few are illustrated below. Many designs may be furnished from standard patterns or modeled to your specifications. Just tell us the size, the purpose of the tablet, and the wording to be used. We shall be glad to submit sketches and quote prices. When necessary, additional blueprints will be furnished. Write for illustrated folder.







Bronze and Aluminum Tablets are used to commemorate the construction of buildings; perpetuate the memory of public servants and benefactors who dedicate their lives to the service of mankind; honor those who served during the campaigns in which our country participated, and for many other purposes. Also available are name plates in any size, with or without titles. Michaels tablets are made of the finest materials obtainable. Lettering, borders and ornamentation are hand chased and burnished for contrast.



Michaels *Time-Tight* Exhibit Cases with Innerlocking Frames



Michaels Table Cases, Wall Cases, Aisle Cases, Suspended Cases, Recessed Cases, or Special Cases are manufactured with either extruded bronze or aluminum frames, and all have Michaels' exclusive innerlocking feature. Satin finish is standard, but if desired, electroplated or polished finishes may be supplied. Frames take full ¼" polished plate glass. Shelves of glass, ¼" or ½", depending on weight requirements, have all four edges polished. Shelf supports are adjustable every inch. Paracentric locks are standard in all locked cases. No screws are exposed on the face of frames except where necessary for removable or hinged panels. If illumination is necessary, it will be the latest and best type. Illustrated folder giving complete specifications will be sent on request.



SPENCER INDUSTRIES, INC.

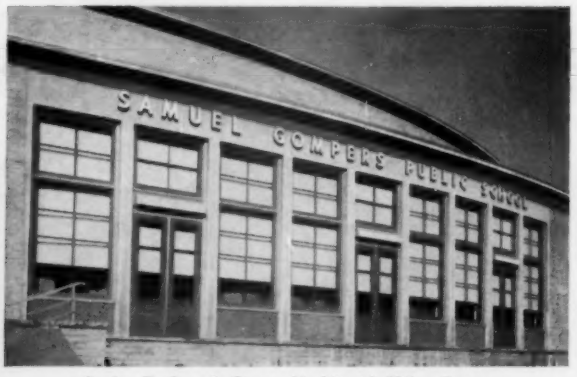
1508 N. Mascher St., Philadelphia 22, Pa.

Signs • Metal Letters • Bulletin Boards • Bronze Tablets

SPENCER INDUSTRIES

WRITE FOR OUR COMPLETE 88 PAGE CATALOG

"Making Metal Letters is Our Business"



Davis, Dunlap & Carver (Architects) Phila. Penna.

Lifetime cast aluminum letters such as those shown above are dignified, attractive and legible. You can save money by purchasing letters made from our standard patterns.



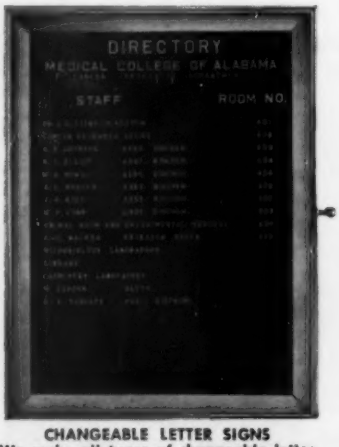
ENGRAVED BAKELITE SIGNS

Size 2" x 8"—$1.75 ea.—$16.20 doz. White Lettering—Black Background More than 300 standard inscriptions carried in stock. Prevent confusion by using these inexpensive signs on all room and closet doors.



Model #75—$15.00 complete

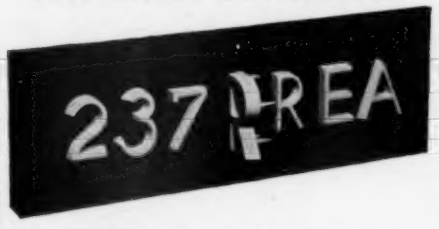
Alumilited Aluminum sign frame—8½" x 4½" high—with two interchangeable graved bakelite sign panels.



CHANGEABLE LETTER SIGNS

We make all types of changeable letter signs, directories and menu boards. Write for our catalog.

CAST BRONZE OR ALUMINUM



NUMERALS AND LETTERS

Sharp spurs that are cast on the backs of these numerals enable them to be attached to wood doors etc. without visible fastenings.

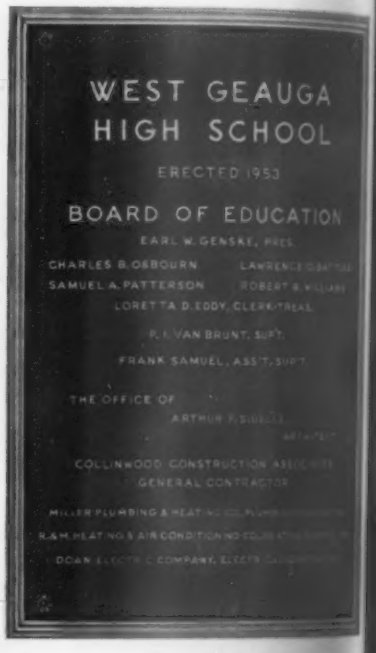
1" size—$1.60
1½" size— 1.80
2" size— 2.00



STYLE #870

RAISED LETTER SIGNS

AND Number Plates—either STOCK SIGNS or made to order from our standard dies. Polished ALUMILITED ALUMINUM lettering and borders make a pleasing contrast against black wrinkle finished backgrounds. Each plate is a solid piece of aluminum—will not tarnish, rust or corrode. Our low prices on these fine signs will amaze you.



MODEL #100
(Made in Any Size)

Bronze or Aluminum Dedication Tablets such as this should be a "MUST" for all new buildings. Besides serving as a historical record these tablets are a tangible tribute to the efforts of officials whose services made the building a reality.



Bulletin Boards (with cork or felt covered backgrounds) made with or without glass doors—wood or metal frames.

UNITED STATES BRONZE SIGN CO., INC.

"Bronze Tablet Headquarters"

570 Broadway, Dept. ASU, New York 12, N. Y.

BRONZE and ALUMINUM TABLETS FOR ALL PURPOSES

MEMORIALS • HONOR ROLLS • DONOR TABLETS • INDIVIDUAL LETTERS
ROOM PLATES • PORTRAIT TABLETS • OUTDOOR SIGNS

As one of America's largest manufacturers of bronze and aluminum plaques and tablets, United States Bronze Sign Company is particularly well equipped to give you expert, prompt and efficient service.
Over a quarter century of experience means you can depend on us for skilled workmanship and highest quality materials at truly reasonable prices. Our outstanding design facilities are always at your disposal. We will gladly submit preview sketches in color designed to your specific requirements without cost or obligation.



Bronze bas-relief tablet. Many sizes and designs available. Hand-sculptured clay model made from your photographs is submitted for approval before casting to assure likeness.



Bronze and aluminum identification plaques for exterior of building. Available in any size, large variety of artistic designs in rich, statuary finish or gleaming satin finish.



Honor rolls. Pay homage to those who served the nation, school, or community. General inscription, as above, or list of names with provision for adding names. Preview drawings in color help you visualize finished plaque.



Dedicatory tablets in bronze or aluminum list all important personages connected with construction in raised letters. Available in any size, large selection of border designs and lettering styles.



School seals made to order. Many duplicate designs save you money; can be made any size.



Simple, dignified dedication plaque for auditorium, gymnasium or other gift or bequest. Permanent recognition encourages future donors. Standard raised letters and borders make for economy in any size.



Testimonial tablet expressing appreciation to outstanding faculty member. Available in many sizes and designs. Handsome, dignified, sculptured portrait busts also made in any size.



Individual letters for outside beautify school exterior. Made in bronze, aluminum, stainless steel, galvaneal, and porcelain enameled iron. Write for our new catalog.

WRITE FOR ILLUSTRATED CATALOG—FREE to Schools and Universities

UNITED STATES BRONZE SIGN CO., INC., 570 BROADWAY, Dept. ASU, N. Y. 12, N. Y.
PLANT AT WOODSIDE, L. I.

GRINNELL COMPANY

Executive Offices, Providence, R. I. — Branch Offices in Principal Cities



School's out . . . and so is the community

Out . . . a desperately needed junior high school. This unsprinklered, three-story brick-and-frame building was already overcrowded when a fire of undetermined origin destroyed it. Overnight the Board of Education was confronted with the problem of fitting 700 students into an overcrowded school system.

Out of pocket. It will cost $2,700,000, officials estimated, to replace this school, insured for $446,660.

Out of date. Progressive communities, aware of the many losses a city or town can suffer in such fires, consider the cost of a Grinnell Automatic Sprinkler System a small price to pay for around-the-clock fire protection. Grinnell Sprinklers stop fire at its source, wherever and whenever it strikes, night or day, with automatic certainty. 77 years experience proves this.

There is a moral obligation on the part of those in charge of schools and universities to provide the utmost protection of life and property. So, for your own sake, be sure that the lives and property for which you are responsible are protected with a Grinnell Automatic Sprinkler System — your assurance of safe, dependable fire protection. Grinnell Company, Inc., 271 West Exchange St., Providence, R. I. Branch offices in Principal Cities.

GRINNELL

PROTECTION AGAINST EVERY FIRE HAZARD

Manufacturing, Engineering and Installation of Automatic Sprinklers Since 1878

C HEATING—PLUMBING—ELECTRICAL—LIGHTING

1. Heating, Ventilation

James B. Clow & Sons	**C–1/Cl**
Herman Nelson Unit Ventilator Products, American Air Filter Company, Inc.	**C–1/Nel**
John J. Nesbitt, Inc.	**C–1/Nes**
The H. B. Smith Co., Inc.	**C–1/Sm**
Armstrong Machine Works	C 9
The Babcock & Wilcox Company, Boiler Division	C 10
Combustioneer Division, The Steel Products Engineering Company	C 11
Cyclotherm, Division United States Radiator Corp.	C 12
Farrar & Trefts, Inc.	C 13
Fedders-Quigan Corporation, Heating Division	C 14
The Russell R. Gannon Co., Inc.	C 15
The International Boiler Works Co.	C 16
Jackson & Church, Furnace Division	C 17
Johnson Service Company	C 18, 19
Johnston Brothers, Inc.	C 20
The Nash Engineering Company	C 21
Petro	C 22, 23
Orr & Sembower, Inc.	C 24
The Swartwout Company	C 25
Titusville Iron Works, Division of Struthers Wells Corporation	C 26, 27
The Trane Company	C 28, 29
The Will-Burt Company	C 30

2. Incinerators

Morse Boulger Destructor Co.	C 31

3. Plumbing

The Powers Regulator Co.	**C–3/Po**
Grinnell Company	C 8
Century Brass Works, Inc.	C 32
Cordley & Hayes	C 33
Crane Co.	C 34, 35
Lawler Automatic Controls, Inc.	C 36
Symmons Engineering Company	C 37
The Halsey W. Taylor Co.	C 38

4. Washroom Equipment

Electric-Aire Engineering Corp.	C 39

5. Lighting

Sunbeam Lighting Co.	**C–5/Su**
General Electric Company	C 40
Benjamin Electric Mfg. Co.	C 41-43
Curtis Lighting, Inc.	C 44, 45
Holophane Company, Inc.	C 46, 47
The Edwin F. Guth Company	C 48
The Thompson Electric Company	C 49

6. Electrical Equipment

Exide Industrial Division, The Electric Storage Battery Company	C 50
Graybar Electric Company, Inc.	C 51

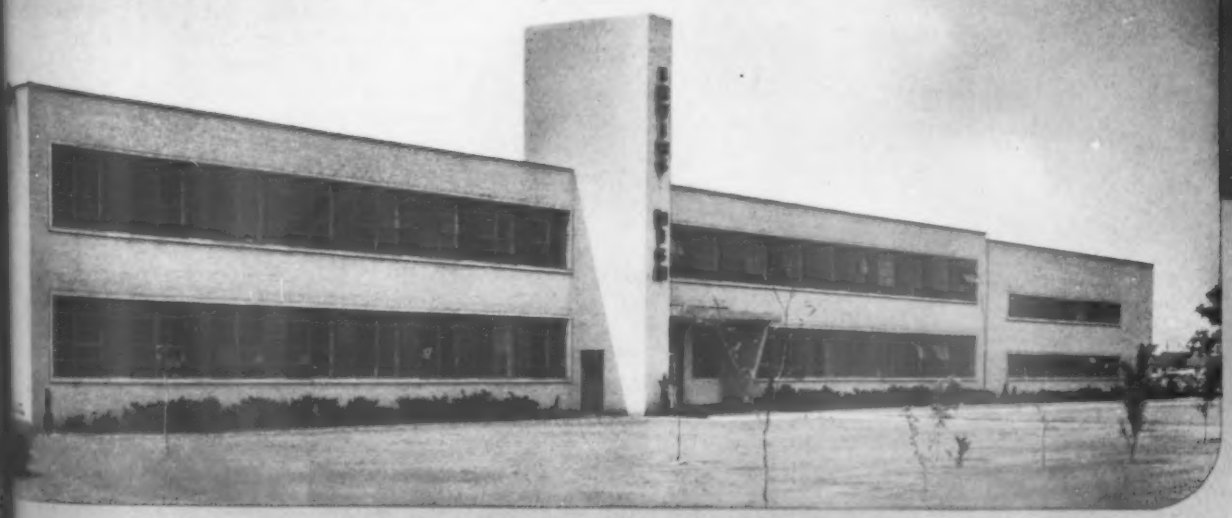
7. Time Signaling Systems

International Business Machines Corporation	**C–7/IBM**
Simplex Time Recorder Co.	**C–7/Si**
Montgomery Manufacturing Co.	C 52

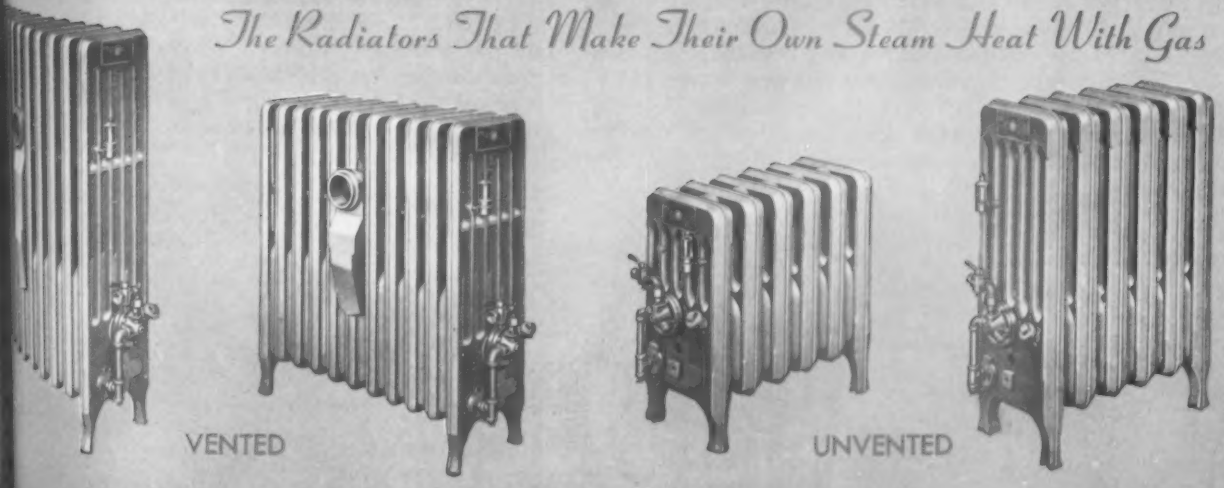
Clow Gasteam Heating Systems for Schools

Approved for use with

MANUFACTURED • NATURAL • MIXED
BUTANE OR PROPANE GAS



The Radiators That Make Their Own Steam Heat With Gas



JAMES B. CLOW & SONS

201-299 NORTH TALMAN AVENUE • CHICAGO 80, ILLINOIS

ESTABLISHED 1878

Advantages OF CLOW

FOR *School* HEATING

The requirements of a good heating system for schools can best be discussed separately under the following headings: COMFORT, ECONOMY OF OPERATION, FIRST COST, MAINTENANCE, SAFETY.



Clow Gasteam Radiators along the outside walls of classrooms put a blanket of warmth between the cold windows and the children.

COMFORT—The best way to heat a classroom (or any room) is to introduce the heat between the occupants of the room and the coldest part of the room—that is, the exposed walls with large glass area. In this way, the cold outdoor air entering the room through the window frames is met by a curtain of warm air and prevented from dropping and moving across the floor to the corridor and creating a cold draft across the legs. CLOW GASTEAM RADIATORS are especially adapted to installation along the outside walls under windows, due to their long, narrow shape. Consequently they do not protrude much into the room.

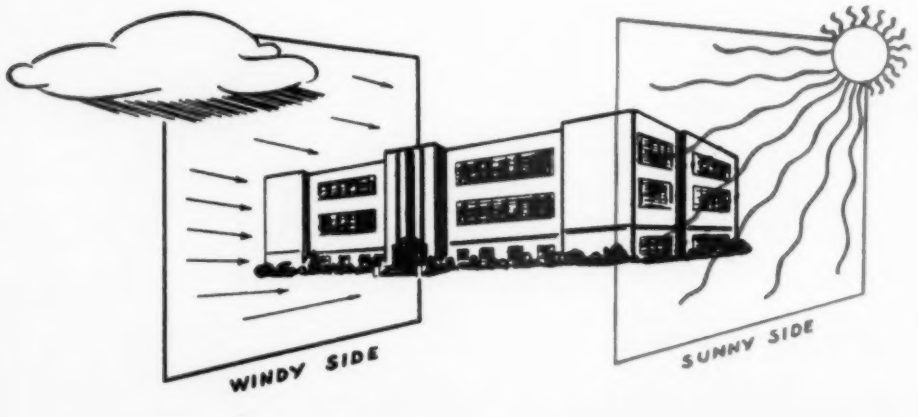
Another important source of comfort in CLOW GASTEAM RADIATORS is *radiant heat*. No matter how warm the air is in a room, heat is radiated from the pupils near the outside walls to the cold windows, causing a chilling sensation even at high room temperature. But this heat lost by radiation is *replaced* by radiant heat passing from the Gasteam Radiators along the cold walls to the pupils, making comfort possible at lower room air temperatures.

More even temperature is possible with automatic room temperature controls applied to CLOW GASTEAM RADIATORS than with warm air heat or cabinet heaters, because cast iron radiators filled with steam "hold their heat." When the room thermostat shuts off the heat, the Gasteam Radiators remain warm for some time, continuing to deliver heat in reduced amount and thus they continue to stop cold-air drafts at their source, even during the "off" cycle of heating. This prevents the condition called "Cold 70" when the thermometer reads 70 degrees at the breathing level, but it feels chilly in the room while the heat is off. But if the room is heated with warm air, or unit heaters or direct fired cabinet heaters, all heat input to the room stops when the thermostat shuts off. The cold air entering the room through the window frames is therefore *not* warmed during the "off" cycle and chilly drafts prevail.

CLOW GASTEAM RADIATORS heat by natural circulation of the air, so there are no annoying hot-air drafts on the pupils. It is very difficult to introduce forced hot air into a crowded room without some of the pupils being exposed to the hot-air stream, which is nearly as uncomfortable as a cool air draft.

In conclusion, a more comfortable heating system for schools than CLOW GASTEAM RADIATORS cannot be found.

ECONOMY OF OPERATION—Comparison of actual fuel consumption, reduced to a unit basis, shows that schools can be heated with CLOW GASTEAM RADIATORS for three-fourths to one-half the fuel used in a centrally fired system. There are two reasons for this large economy. In the first place, GASTEAM RADIATORS generate the heat right in the rooms where it is needed, whereas a central heating plant generates the heat at some distance from the rooms where it is needed, and consequently an appreciable amount of heat is lost through pipes leading from the generating point to the places where it is needed.



The heating problem illustrated and so often encountered in school heating is best solved by Gasteam Radiators, due to their flexibility. The radiators on the sunny side of the building can be turned off either manually or automatically, while those on the windy side can be left in operation. Only the flexibility of individual room heaters can accomplish this task effectively.

Gasteam RADIATOR HEAT

In the second place, the individual control of CLOW GASTEAM RADIATORS provides a heating system with the flexibility necessary for school heating in the South. The rapid changes of weather make flexibility a "must." A central heating plant cannot respond quickly enough to the weather changes—by the time the system reaches capacity, heat is no longer needed and is subsequently wasted. Often the sun is shining on one side of the building while the other side is in shade and exposed to the wind. In such cases, the Gasteam Radiators on the sunny side automatically shut off, while those on the windy side remain in operation. This means more comfort—the avoidance of over- and under-heating and unexcelled fuel economy.

Also, it is often necessary to heat just a room or two after school hours; for instance, the board meeting room, principal's office, etc. With CLOW GASTEAM RADIATORS it is possible to heat just these rooms, but with a central heating plant, the whole plant must be kept in operation just to heat a room or two, with a consequent drop in economy of operation.



The principal's office is often used after school hours, and when the school is heated with Clow Gasteam Radiators, the radiators in all other rooms can then be turned off.

FIRST COST—According to recent alternate bids, a vented CLOW GASTEAM RADIATOR heating system costs a little more than half the cost of a two-pipe vapor or vacuum central heating plant in schools requiring up to 6,000 square feet of steam radiation. The central system gains the advantage as the size of the school increases somewhere beyond this figure. This type of central system most nearly approaches the comfort provided by a Gasteam Radiator system, but cannot approach its economy of operation. Another advantage of a Clow Gasteam radiator heating system is that if it becomes necessary to enlarge a school building, the heating plant can easily be extended by merely adding the necessary number of Gasteam radiators. Often the boiler of a central heating system is not large enough to permit extension.

MAINTENANCE—Since CLOW GASTEAM RADIATORS have no major moving parts to wear out, nor sheet metal casings to be damaged and are made of long lasting cast iron, they will last longer than any other heating system on the market at the lowest maintenance cost. Many schools in the South are still using the CLOW GASTEAM RADIATORS which they installed over twenty years ago. Before considering other methods of heating Southern schools, find out if they have a twenty-year service record. When the maintenance cost is added to the fuel cost and compared to the corresponding cost of other systems, it will be found that CLOW GASTEAM RADIATORS have no equal for economy.

SAFETY—The flame is entirely enclosed in a combustion chamber at the bottom of the radiator sections and no part of the radiator is hotter than steam—a safe temperature. CLOW GASTEAM RADIATORS are approved by the American Gas Association Testing Laboratories and listed by the Underwriters' Laboratories. This means compliance with National safety standards. Also, recognized and responsible organizations have made exhaustive tests on CLOW GASTEAM RADIATORS either at the company's request or for various boards. Synopses of these tests proving the safety of Gasteam Radiators will be sent anyone requesting them.

Rural Schools situated too far from a gas main can have the many advantages of Clow Gasteam Radiator heat by using LP gas. Clow Gasteam Radiators are approved for use with butane and propane gases as well as city gases.

Consult your Architect about Clow Gasteam Radiators for heating any new school or school addition you are contemplating. For further information and list of near-by satisfied users, write James B. Clow & Sons, P.O. Box 6600 A, Chicago 80, Illinois, and we will put you in touch with our nearest distributor.

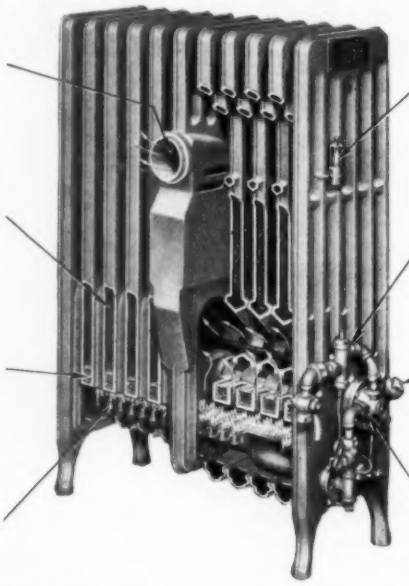


Clow Gasteam Radiators located near the entrance doors will prevent cold air from entering the corridors. Warm corridors are a great help in keeping classrooms comfortable and reducing cost of heating.



The all-purpose room, or combination cafeteria and auditorium, can be quietly and comfortably heated by Clow Gasteam Radiators without any high-velocity hot-air currents moving about the room.

OPERATING PRINCIPLES OF CLOW GASTEAM RADIATORS



Vent connection through which products of combustion are taken outside of the building.

Steam rising in the radiator sections and evenly heating all portions of the radiator.

Boiling water that is heated from the gas flames below it and which supplies the steam.

Gas burner enclosed in a combustion chamber in the bottom portion of the radiator sections.

Air valve that automatically allows air in the radiator to escape, but holds back steam.

Automatic safety pilot valve which prevents flow of gas unless pilot is burning.

The filling cup by means of which the water supply for generating the steam is replenished.

Steam regulator that automatically controls the size of the gas flame to maintain uniform heat in the radiator.

AVAILABLE IN 38″ AND 32″ HEIGHTS—VENTED
AND IN 22″ AND 31″ HEIGHTS—UNVENTED

Each Clow Gasteam Radiator is a complete steam heating unit designed to heat the room in which it is located. The steam is generated right in the radiator itself, eliminating the need for boiler, steam piping or a basement.

The water for making the steam in a Gasteam Radiator is located in a chamber in the lower part of the radiator sections. Directly below the water chamber is a gas burner. The gas flames are entirely enclosed by the lower part of the radiator sections. The heat from the gas flames boils the water and the steam rises into the radiator tubes where it condenses, giving up its heat to the room air. The water from the condensed steam returns to the water chamber where it is re-evaporated.

No water pipe connection is required for the water chamber which is replenished through a filling cup with any convenient water container with a spout. Semi-monthly inspection and replacement of any water that has escaped through the automatic air valve is all that is necessary.

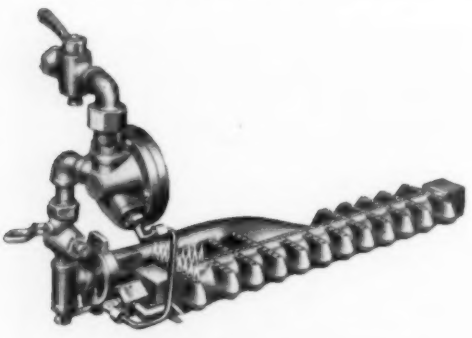
A steam pressure regulator gradually lowers the gas flame so that from eight to ten pounds of steam pressure is maintained when a radiator is in full operation.

An automatic air valve permits all air to leave the radiator as steam is generated, but will not permit the steam to escape. A steam pressure relief valve (safety valve) relieves excessive steam pressure should some abnormal condition cause the pressure to rise above normal.

Clow Gasteam radiators may be equipped with Two-Way Pilot Burners and Automatic Cut-Off Valves (safety pilots). The pilot portion of the Two-Way Pilot Burner keeps the water in the radiator warm while the main part of the burner is off and the Automatic Cut-Off Valve automatically shuts off *all* gas flow to pilot and main burner in case the pilot is not burning.

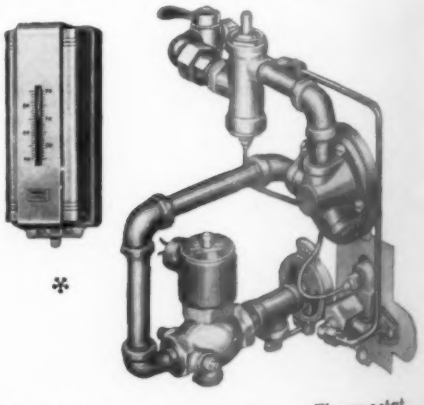
Either a Non-Electrical Combined Type or an Electrical Remote Type Room Thermostat may be added to the Two-Way Pilot Burner and Automatic Cut-Off Valve combination so that the room temperature can be controlled automatically.

CONTROLS FOR CLOW GASTEAM RADIATORS



Two-Way Pilot Burner Showing Main Part of Burner Shut Off.

This pilot is more stable than the type that is separated from the main burner and it is an exclusive Clow feature. It is used in connection with the automatic cut-off valve (safety pilot).



Electrical Remote Type Room Thermostat.

Wall thermostat can control four magnetic valves. The non-electric combined type individual thermostats can also be supplied.

AAF Herman Nelson

UNIT VENTILATOR NEWS

DRAFT STOP

American Air Filter Company, Inc. UNIT VENTILATOR PRODUCTS Louisville 8, Kentucky

DRAFT|STOP SYSTEM FEATURES LOWER INSTALLATION, OPERATING COSTS

Unique Draft Elimination Method Saves Fuel, Simplifies Cooling



While cold drafts are a problem near the window, the rest of the room may actually be overheated. For this reason DRAFT|STOP doesn't combat dangerous window downdrafts with additional heat but solves the problem sensibly and economically.

DRAFT|STOP traps the cold air at the window before it can spill onto the students. Once trapped by the cold air slot behind the utility cabinets, this cold air is either drawn into the unit ventilator for conditioning or expelled from the building entirely.

The unit is never in the compromising position of having to heat and cool simultaneously—a situation certain to exist where additional heat is used to combat drafts.

Don't look upon the problem of overheating as a fad—it's a fact. And DRAFT|STOP *solves* the problem in a way that also saves *dollars*. For complete information, see our catalog in Sweet's Architectural File, or write Herman Nelson Unit Ventilator Products, American Air Filter Company, Inc., Louisville 8, Ky.



DRAFT|STOP provides complete classroom comfort, economically at Westvale School, Anderson, Indiana. Superintendent of Schools: G. E. Ebbertt; Architect: Miller & Henning; Engineers: Ammerman, Davis & Stout, Inc.

Savings Start At The Drafting Board

The DRAFT|STOP economy story begins with school construction. A building utilizing the cooling, heating, ventilating and draft elimination features of DRAF|TSTOP requires no costly supplementary radiation—no vent flues, corridor venting or exhaust fans.

Most of the windows can be permanent glass windows, thus eliminating the extra costs connected with installation of "opener" windows (as much as $25 per window for hardware alone).

DRAFT|STOP Economy Continues In Day-To-Day Operation

Since the major function of the unit is cooling—to compensate for the natural heat gain from students, lighting and solar effect—DRAFT|STOP heats *only when heat is needed* to bring the classroom to perfect comfort level.

When the unit *is* heating, fuel dollars don't go "out the window". Comfort plus cash savings—that's why budget-minded schools are DRAFT|STOP's best customers.

AAF herman nelson

UNIT VENTILATOR NEWS

American Air Filter Company, Inc. UNIT VENTILATOR PRODUCTS Louisville 8, Kentucky

NEW DEVELOPMENTS HIGHLIGHT HERMAN NELSON RESEARCH PROGRAM

New Light|Stop Accessory Aids Audio-Visual Classroom



Light|Stop solves the problem of retaining classroom comfort while classrooms are darkened for audio-visual sessions.

Before the development of this new accessory, billowing curtains and streaks of light distracted students from their learning tasks. The alternative was to turn off the unit ventilator. This robbed the students of the essentials for comfort just when they needed them most.

Light|Stop prevents flapping of curtain and keeps out light streaks. Thus, audio-visual classrooms can now have their darkness . . . and *comfort,* too! Send for Bulletin 600-A7.

More Colors Now Available For Unit Ventilators

Herman Nelson now offers *seven* colors for unit ventilators:

SAHARA TAN
PLATINUM GREEN
AUTUMN GREEN
COLONIAL BLUE
MIST GRAY
TROPIC GREEN
CORAL TAN

In addition, there are now *five* distinct selections in *lineoleum* patterns and colors for unit ventilator tops. This comprehensive range provides colors that will blend or contrast with any classroom color scheme.

Bulletin 600-E3 contains actual painted panels of all unit ventilator colors and four-color reproductions of the linoleum patterns. Send for your copy.

Classroom Filter Cuts Costs In Half

The new Herman Nelson Renewable Filter utilizes highly effective AMER-glas media at a cost one-half that of replaceable filters. Here's all you do to change media:



Remove filter from unit ventilator. Open frame, take out media and dispose of it in wastebasket.



Pull out desired length of AMER-glas media from carton dispenser and cut off with scissors.



Place clean media in filter frame.



Replace filter in unit ventilator.

Herman Nelson Offers Complete Line For All Classroom Cooling, Heating And Ventilating Needs

AUDITORIUM UNIT VENTILATORS

For use where large volumes of air need to be heated and circulated, such as auditoriums and gymnasiums.



UNIT VENTILATOR CONVECTORS

For both DRAFT|STOP and General Purpose Units—designed to harmonize with the unit ventilator.



UNIT VENTILATOR UTILITY CABINETS

Available in a variety of sizes and color schemes and designed to harmonize with the two product lines.



DRAFT|STOP WALL

For use where it is not desirable to use DRAFT|STOP Utility Cabinets or cavity wall construction.



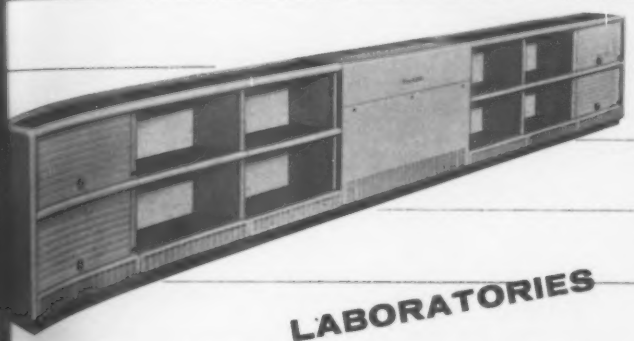
UDITORIUMS

CAFETERIAS



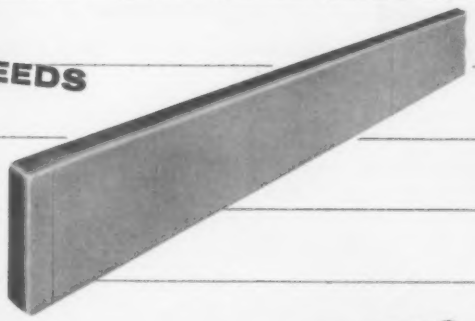
YMNASIUMS

SHOPROOMS



LABORATORIES

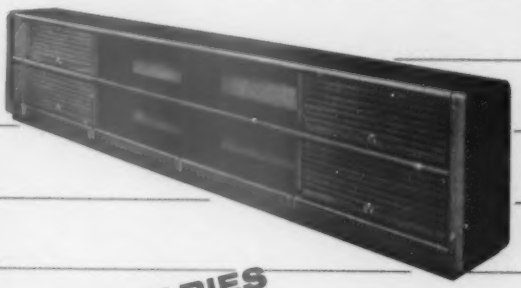
TORAGE NEEDS



PERIMETER HEATING

C-1/Nes

OFFICES



LIBRARIES



CORRIDORS



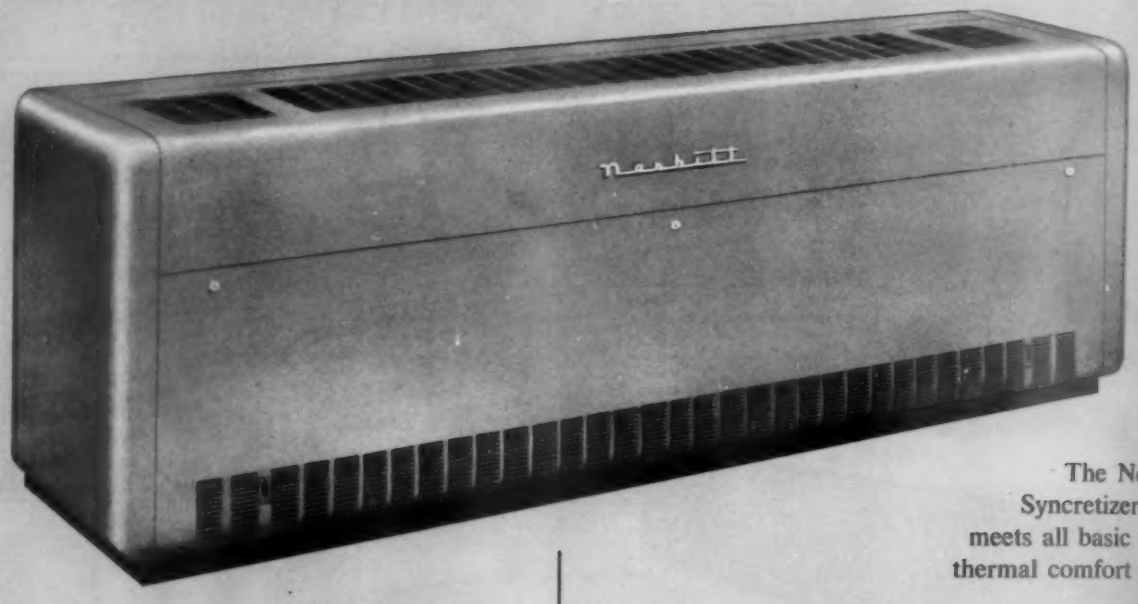
CLASSROOMS

Nesbitt

HEATING & VENTILATING EQUIPMENT FOR SCHOOLS

Made and sold by John J. Nesbitt, Inc., Philadelphia 36, Pa.
Sold also by American Blower Corporation

THE NESBITT SYNCRETIZER



The Nesbitt Series 5[illegible] Syncretizer Unit Ventilator meets all basic requirements for thermal comfort in the classroom

For the protection of comfort and health in schoolrooms, Nesbitt unit ventilators are today's standard to which all others are compared.

The Syncretizer provides quick, economical heating, tempered outdoor air for ventilation and cooling as needed, under room-by-room automatic control with all factors balanced for perfect thermal comfort.

cycles of control

The Syncretizer may be adjusted to operate under four distinct cycles for ventilation control: *TYPE F, all outdoor air; TYPE A, variable quantity of outdoor air with a fixed minimum; TYPE O, variable quantity of outdoor air without a fixed minimum;* and *TYPE W, a combination cycle.*

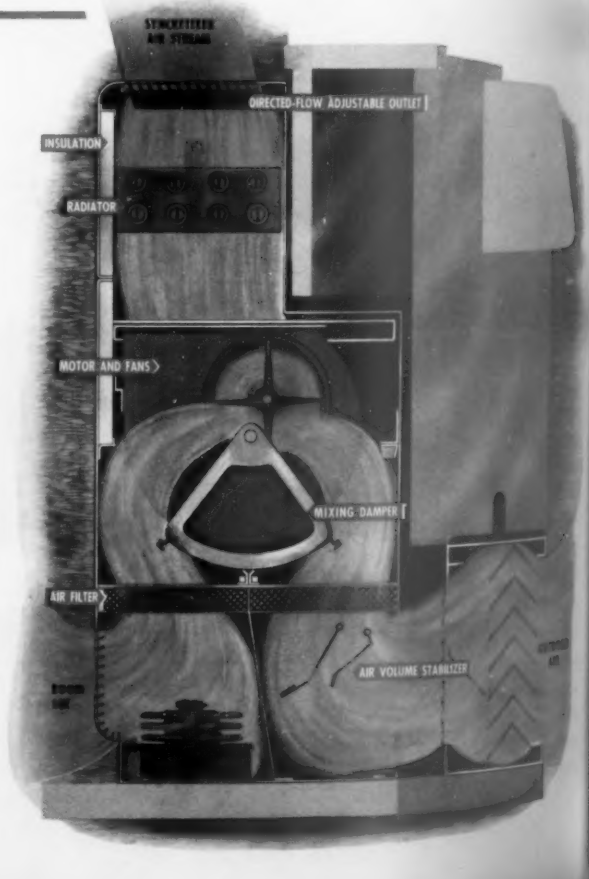
These cycles provide different sequences of radiator and damper operation for mixing outdoor and room air. In all four cycles, the damper is closed to outdoor air until room temperature is just below the thermostatic setting. It then introduces outdoor air in quantities according to the cycle.

As room temperature approaches the control setting, the room thermostat gradually closes the radiator valve. Should room temperature rise above the control setting, the valve will close completely and cooling air will be introduced into the room under air-stream thermostat control.

Sizes and Capacities, Non-Recessed Units

Model	Anemometer A Rating	Length	Height	Depth
554	750 CFM	59″	32″ or 28″	14½″
564	1000 CFM	69″	32″ or 28″	14½″
572	1260 CFM	77″	32″ or 28″	14½″
580	1560 CFM	85″	32″ or 28″	14½″

Capacities and dimensions other types, Pub. 261.



simplified interior design

The Syncretizer has less moving parts than any other unit ventilator—for long, trouble-free performance. The all-steel cabinet (no parts less than 14 gauge) uses rigid weld construction. Metal is coated for rust prevention; finish is hard-baked enamel, choice of six decorator colors. The one-piece insulated front panel removes easily for seasonal cleaning and motor oiling. The steam-distributing-tube radiator is above the motor and fan assembly. Piping, valves and electric connections are within the ventilated ends. Ends remove for integration with storage units.



motor and fan assembly

This assembly is the simplest known means of powering fans. Located *below* the radiator, the fans are protected and the motor is cooled by unheated air. The air stream, heated after it leaves the fans, gains 10% in volume—less work for the fans, quieter operation, lower current consumption. The motor is totally-enclosed, resilient-mounted, multi-speed, condenser type—no brushes, internal contactors, or switches. Multi-blade aluminum fans are mounted on solid steel shafts extending from motor ends.

This exclusive floating fan principle has been used on all Nesbitt unit ventilators since 1917. It eliminates all couplings, belts, drives, outboard bearings, and alignment problems.



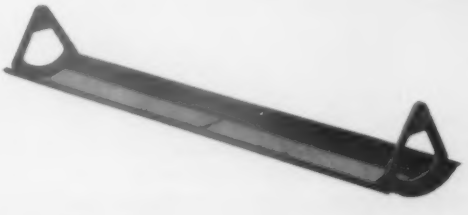
directed flow outlet

A series of adjustable vanes below the discharge grille permits the air-stream direction to be varied from extreme left to extreme right. Adjustment is made on the site, to give a discharge pattern of maximum effectiveness for every classroom condition.



one piece roll damper

This marvel of simplicity has been standard equipment in Nesbitt Syncretizers since 1922. The damper operates on but two bronze bearings. Automatically controlled, it mixes indoor and outdoor air to help achieve maximum fuel economy. Easily adaptable to meet changing ventilation requirements, it is one guarantee that time will not outmode the Nesbitt Syncretizer.



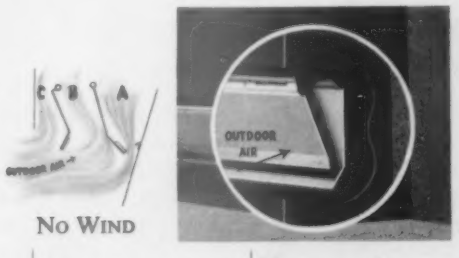
air volume stabilizer

Two self-operating pivoted vanes gradually restrict the outdoor air opening as wind velocities increase. Outdoor air in excess of the designed percentage cannot enter. Cold drafts and "blow-through" are eliminated without affecting room-air recirculation. Only the specified quantity of outdoor air needs to be heated—achieving an unequalled operating economy.

No Wind—Vanes A and B lean slightly, sensitive only to the normal volume of outdoor air entering the unit.

Medium Wind—As wind velocity increases and more air attempts to enter, the vanes swing inward, restricting the opening.

Strong Wind—When the wind reaches higher velocities, the vanes swing fully to close all but about 25% of the original area. Outdoor air must now flow through the small opening, C; the volume is insufficient for blow-through but adequate for the ventilation requirements. (As the wind diminishes, the vanes return.)



No Wind



Medium Wind



Strong Wind

THE NESBITT SYNCRETIZER WITH WIND-O-LINE RADIATION

For the achievement of a fully symmetrical thermal environment in classrooms having large surfaces exposed to cold outdoor air—such as the modern window wall — it is recommended that Nesbitt Wind-o-line Radiation be integrated with the Syncretizers.

Nesbitt Wind-o-line is fin-and-tube radiation extending from both ends of the ventilating unit for the full length of the windows—at the sill line—and continuing, if required, along cold outside walls. Wind-o-line comes recessed in Nesbitt storage cabinets, or in its own grilled wall-hung casing (see descriptions on the opposite page).

NESBITT WIND-O-LINE RADIATION solves a *heat loss* problem with a *heat gain*—where and when needed. Convected warm air from the Wind-o-line grille tempers and diverts the down-draft from cold walls and windows; radiation from the Wind-o-line casing reduces the loss of body heat to cold surfaces.

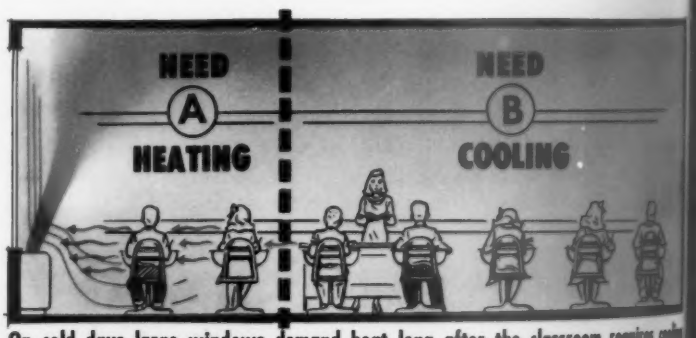
Wind-o-line is the first line of defense in classroom heating and ventilating. In many cases this radiation will remain on continuously during school hours in sub-freezing weather regardless of sun exposure. In mild weather—up to 50°—it will remain on for a major part of the school day. Even in weather above 50° Wind-o-line will function for early warm-up and occasionally during the day. It remains on as long as needed for cold surface protection and shuts off immediately when more than the designed minimum quantity of outdoor air is required for cooling.

Floor temperatures are raised from two to four degrees.

Classroom Thermal Comfort is Really TWO Problems

In fully occupied classrooms, for much of the time, the air stream discharged by the unit ventilator must be *cooler* than the desired room temperature to prevent overheating. At the *same time* in frigid weather, the large window surface (like a wall of ice) creates a chilling downdraft, robs heat from pupils' bodies.

The unit ventilator alone cannot at the same time provide cooled air for ventilation and heated air for cold surface protection. The two distinct needs require separate handling.



On cold days large windows demand heat long after the classroom requires cooling

The complete Nesbitt system — Syncretizer with Wind-o-line — solves both problems, separately, but under unified control. Wind-o-line's convected and radiated heat remains on for so long as the threat of cold surface downdraft exists — and without inhibiting the Syncretizer. Wind-o-line is more than the answer to window downdraft; it ends excessive radiation of body heat and is a step toward the easier solution of problem B.

Wind-o-line solves problem A **—and the Syncretizer more readily solves problem B**

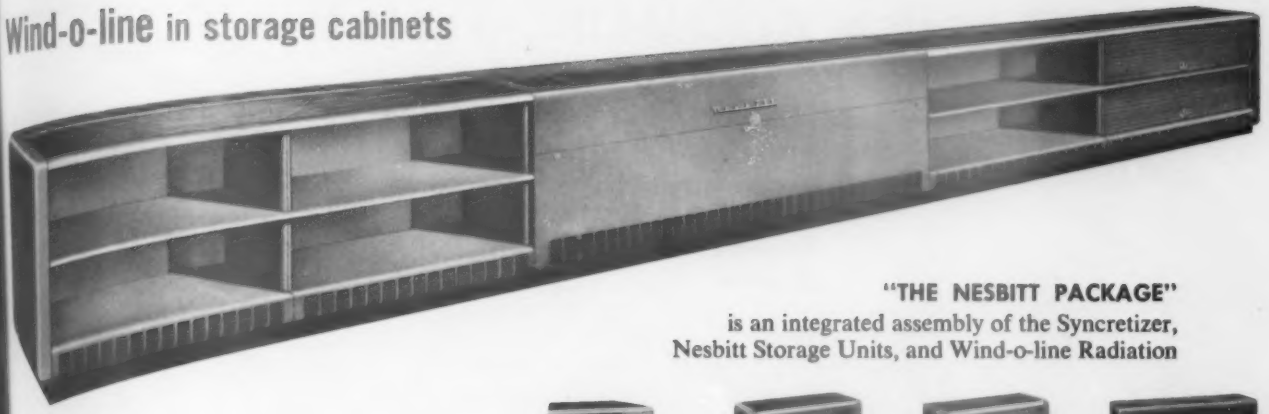
With cold surface protection assured by the Wind-o-line, the Syncretizer ventilating unit can function with a generally lower room thermostat setting, adding or removing heat according to room requirements. The cooling power of the Syncretizer is never restricted. Wind-o-line shuts off when more than the designed minimum quantity of cooling outdoor air is needed.

The result is a symmetrical thermal environment—ideal working conditions for teacher and pupils—achieved at lowest operating cost.

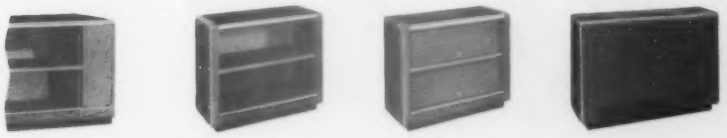


Simultaneously: cold surface protection and classroom cooling, for perfect comfort

Wind-o-line in storage cabinets



"THE NESBITT PACKAGE"
is an integrated assembly of the Syncretizer, Nesbitt Storage Units, and Wind-o-line Radiation



Wind-o-line Radiation is offered for use with the standard storage units now such a popular feature of The Nesbitt Package. The fin-and-tube radiation is recessed at the back of the cabinets below the Wind-o-line grille, and the cabinets are channeled for room air intake at the floor level.

Nesbitt open and closed storage units are constructed of 16-gauge furniture steel, all welded. Shelf surfaces are smooth, edges rounded. Receding doors for the closed units operate freely, quietly, and are available with lock and key.

Three lengths (24″, 36″, 48″) and two heights (32″ or 28″) are available; depth, 14½″. Fill-in sections for wall-to-wall.

WIND-O-LINE SIZES AND CAPACITIES

Wind-o-line fin-and-tube radiation is recessed in Nesbitt storage cabinets of the styles, heights, and lengths listed at left, channeled for floor intake.

Wall-hung Wind-o-line comes in casings 2⅜″ deep, 10″ high, and four standard lengths; 3′6″, 4′, 5′, and 6′.

Both types are available in 450, 550, and 700 Btu per lin. ft., basic steam rating.

Wind-o-line in wall-hung casings

Wind-o-line Radiation is offered also in slim casings of modern design for wall suspension at the sill line, and integration with Nesbitt Syncretizers. The casings are of 16-gauge steel and have removable fronts. They are finished to match the Syncretizer. Wind-o-line may be applied to two-pipe steam systems or to forced hot water heating systems.

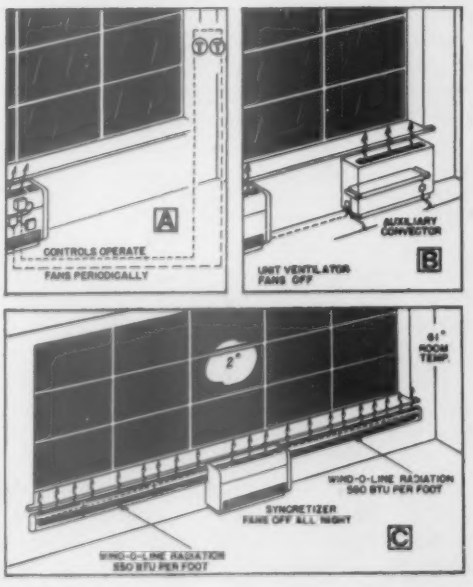


Maintenance of overnight temperatures

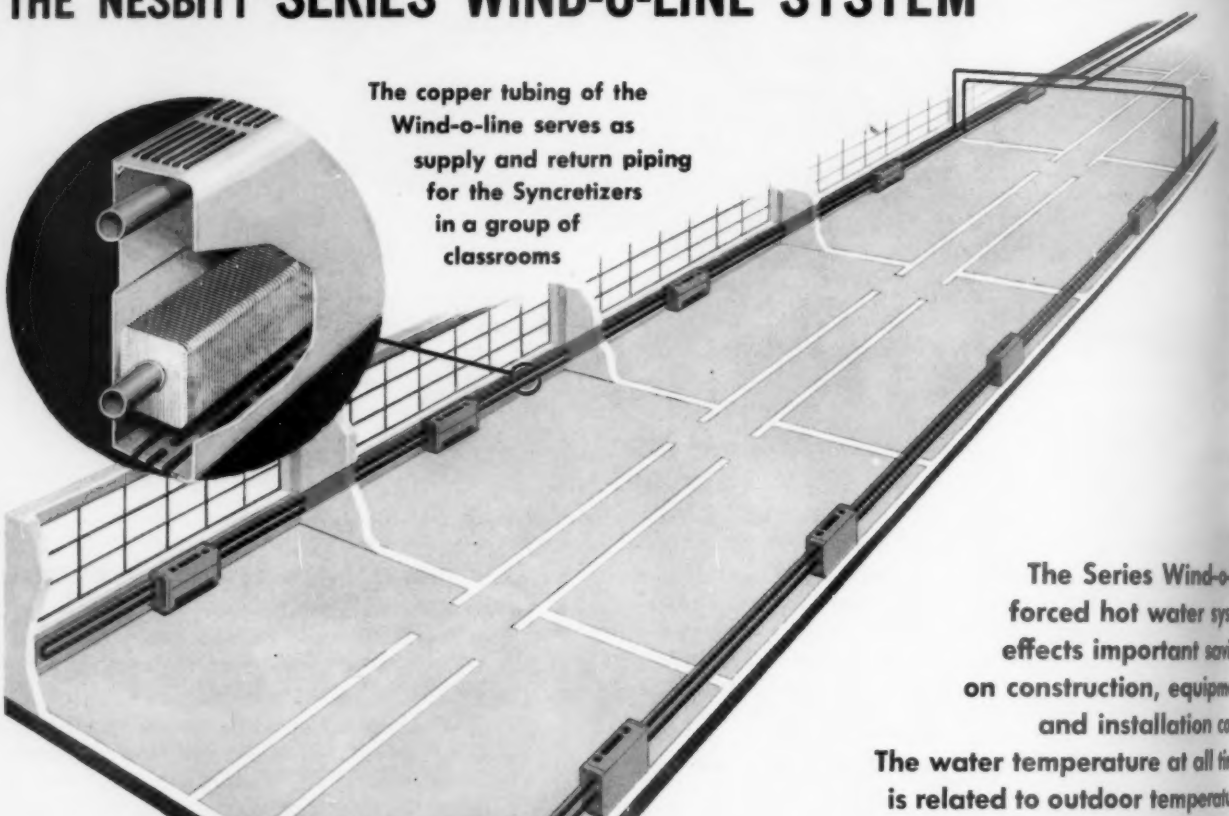
It is generally agreed that classroom temperatures should be maintained at about 55° overnight and during periods of shut-down in cold weather. This permits quick recovery and more flexible control during first hours of the next school day. (Cutting the heat off altogether, and letting the room temperature drop to 40° or 45°, makes recovery difficult—particularly in restoring heat to floor slab, walls, desks, etc.—and leads to morning room temperature fluctuations, possible overheating, and abnormal heat loss by pupils to surrounding objects.)

To maintain an optimum overnight temperature, users of unit ventilators without Wind-o-line must resort to A, operating the units as recirculating heaters under thermostat conrol; or B, installing supplementary gravity heat, with piping and controls.

Field tests prove that when Wind-o-line Radiation is integrated with Nesbitt Syncretizers, C, the gravity heating capacity is ample to maintain overnight classroom temperatures of 55° in zero weather. Hence, Wind-o-line eliminates the cost of separate provision for maintaining overnight temperatures.



THE NESBITT SERIES WIND-O-LINE SYSTEM



The copper tubing of the Wind-o-line serves as supply and return piping for the Syncretizers in a group of classrooms

The Series Wind-o-line forced hot water system effects important savings on construction, equipment and installation costs. The water temperature at all times is related to outdoor temperature, thus improving the control of individual room temperature by the Syncretizer and the protection against cold surfaces by Wind-o-line.

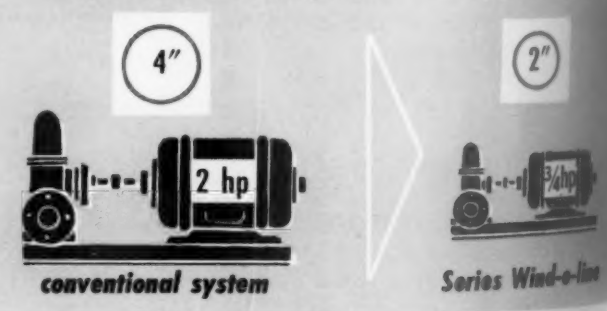
smaller pipes and pumps

Syncretizer new hot water heating elements are designed for the effective use of smaller quantities of water—and they combine with Wind-o-line in this Nesbitt System to heat classrooms with one-half to one-third the water required in conventional systems. Therefore, piping and pump sizes are smaller throughout this system, effecting big savings in first cost and operating cost.

variable water temperatures

The temperature of the water in the Series Wind-o-line System is at all times related to outdoor temperature. As the outside temperature falls, the water temperature and the heating capacity of Wind-o-line are increased. Cold surface protection is in direct proportion to the need: the window zone is comfortable in any kind of weather. And relating water temperature to weather adjusts the Syncretizer's heating capacity to the load—makes it easier for the room temperature controls to do a better job.

comparison of mains and pumps for a 20 classroom wing



conventional system — *Series Wind-o-line*

School mechanical system costs REDUCED

The Nesbitt Series Wind-o-line System combines Syncretizer heating and ventilating units with Wind-o-line radiation in forced hot water applications—grouping multiple classrooms or entire wings in series-loop circuits. The Wind-o-line copper tubing serves as the only required supply and return piping—eliminating much of the costly pipe trenches, mains, runouts, and pipe covering. Smaller pipes and pumps are employed because the system uses far less water. Nesbitt packaged piping cuts labor costs.

The components of the Series Wind-o-line System are united by the packaged piping installed within the Syncretizer. The crossover tubing in the unit, the expansion loops, the balancing valve, and even the return connection from the unit ventilator heating element to the Wind-o-line tube, are all prefabricated and factory-installed.

The costly jobsite fitting of individual runouts is eliminated. The supply connection, including the control valve, is the only unit connection which needs to be made in the field.

The important material—and labor-saving advantages of Nesbitt packaged piping are but one of the economies assured by the Series Wind-o-line System. Actual awards of new school building contracts employing this system are confirming the saving of 20 per cent or more of the costs of normal mechanical systems using pipe trenches and runouts.

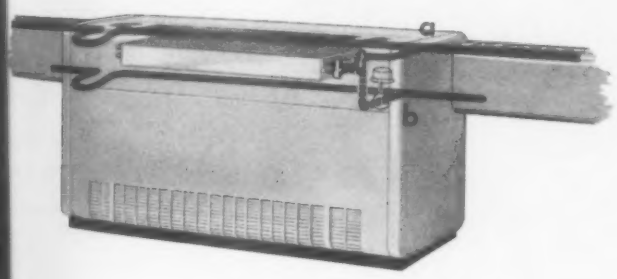
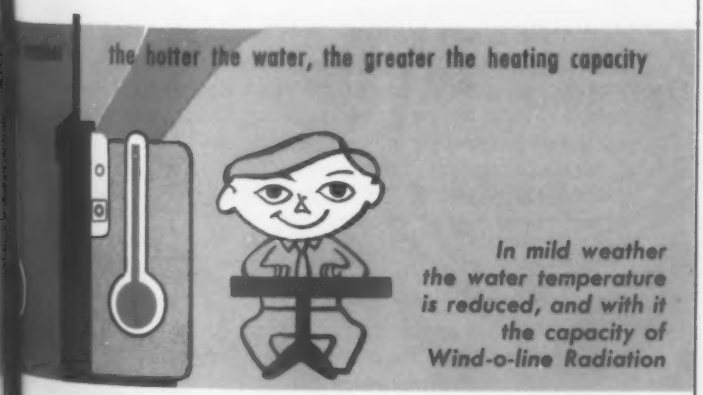


Diagram above: (a) Crossover return tubing, expansion loop, and air vent fitting come pre-assembled and connected to the heating element. (b) Crossover supply tubing, expansion loop, and balancing valve are furnished installed. The minimum of labor and material required at the site reduces installation cost.



In mild weather the water temperature is reduced, and with it the capacity of Wind-o-line Radiation

Classroom comfort and protection INCREASED

The Series Wind-o-line System gives Nesbitt Syncretizer thermal comfort, controlled to individual room requirements, plus the cold wall and window protection of Wind-o-line radiation. Because the system water temperature is constantly related to outdoor temperature, the water gets hotter as the weather gets colder—the control of individual room temperature is improved and the cold surface protection of Wind-o-line is always proportioned to the actual need. The same system gives overnight protection.

Summary of the advantages

- Improved room temperature control.
- Increased protection against cold surfaces and window downdraft.
- Costly pipe trenches, pipe covering, and traps are eliminated.
- Smaller pumps cost less to buy and operate with greater economy.
- Mains and piping are shorter, simpler.
- Packaged piping within the Syncretizer reduces installation costs.
- No additional controls and equipment are required for nighttime heating.

Average HW Temp. Entering Air 70°	HEATING CAPACITIES—BTU/LIN. FT. vs. Average Forced Hot Water Temperature	
	Wind-o-line Type No. 600A—600B	Wind-o-line Type No. 800A—800B
110°	60	80
120°	120	160
130°	180	240
140°	240	320
150°	300	400
160°	360	480
170°	420	560
180°	480	640
190°	540	720
200°	600	800
210°	660	880
220°	720	960
230°	780	1040
240°	840	1120

Nominal tube sizes: 600A and 800A, 1"; 600B and 800B, 1¼".

New Colors and Sunboard

All items of Nesbitt schoolroom equipment —Syncretizers, Storage Cabinets, Wind-o-line, and Sill-line Radiation—are now available in your choice of a matching line of six appropriate colors at no extra cost.

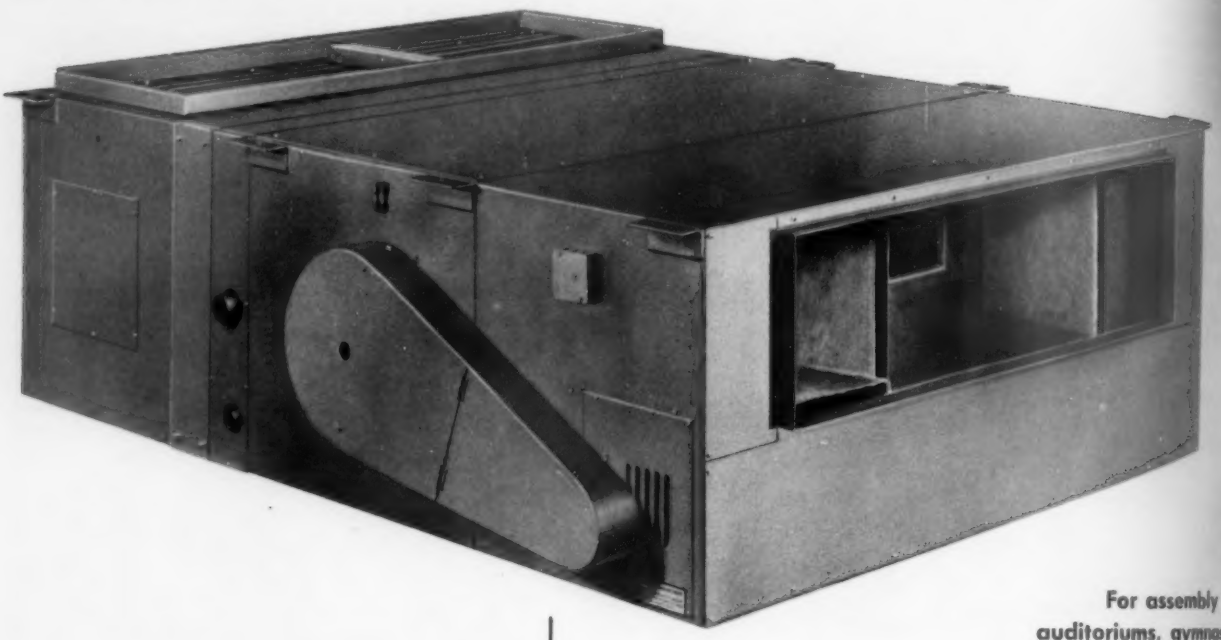
Additional upgrading is given the Nesbitt Syncretizer and Storage Cabinets through a new laminated plastic sunboard in a choice of five harmonious colors. This hardtop material resists cracking, chipping and abrasion, and is easy to clean.

Of further interest is the Nesbitt new shallow wall box. This outdoor air inlet is only 2⅛" deep and is suitable for either prefab panel or masonry walls. Its vertical louvers provide better elimination of air-borne water than do wall boxes of conventional design. Shown below.



THE NESBITT SERIES T THERMOVENT

For heating and ventilating large interiors
Engineered for Quietness



For assembly halls, auditoriums, gymnasiums, cafeterias and similar areas

meets all requirements

School assembly spaces are characterized by large room volumes and periodic but extremely heavy occupancy loads.

These characteristics dictate four basic requirements of the heating and ventilating equipment:

A controlled thermal environment;

Adequate ventilation;

Absence of objectionable drafts;

Quiet operation.

The Nesbitt Series T Thermovent fully meets these requirements. It is the result of many years of specialized experience in the field of schoolhouse heating and ventilating.

NESBITT offers the Series T Thermovent in two basic types to meet the two installation requirements normally encountered:

Type HP, for High-Pressure Systems

This unit attains higher fan speeds and outlet velocities—to overcome the higher resistance of systems for which it is designed. Seven models, 15,000 to 3500 cfm.

Type LP, for Low-Pressure Systems

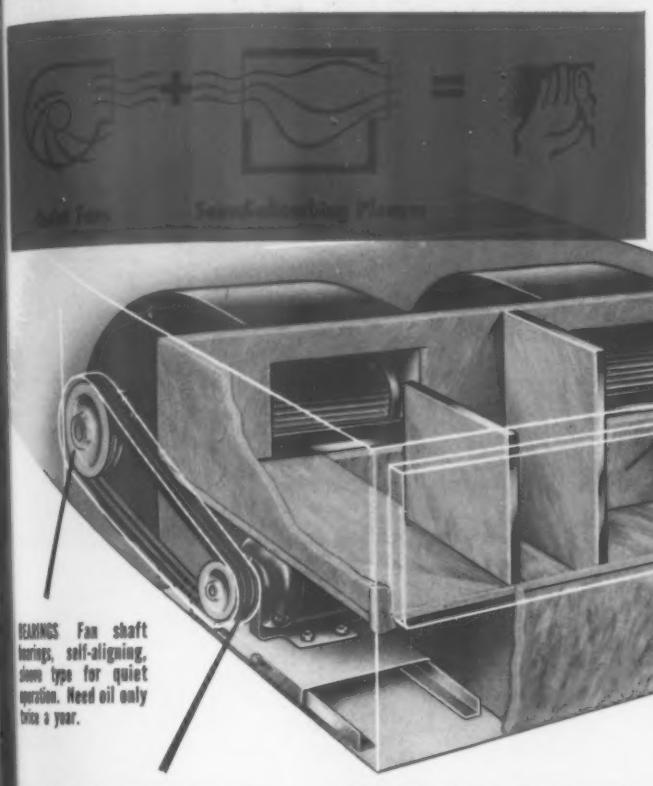
This unit operates at low fan speeds and discharge velocities — to insure quietness with adequate air delivery. Nine models, 10,000 to 1250 cfm.

A controlled thermal environment. Large areas and heavy intermittent occupancy are involved. Thermovent has adequate heating capacity to bring the space quickly to the desired temperature, and to maintain it there. With full occupancy, bodily heat loss is such that cooling, rather than heating, is needed—even in sub-freezing weather. Thermovent has a large air volume for the removal of heat whenever required. And Thermovent responds immediately to changes in thermal demands.

Heating elements have steam-distributing tubes; control is by valve modulation. All air passes through the coil, preventing the stratification caused by by-passed air. Outdoor-air and recirculated-air dampers are inter-connected by balanced blades to permit continuous floating control. After initial warm-up of the space, the desired minimum volume of outdoor air is mixed in the air stream; thereafter the percentage of outdoor air above the fixed minimum depends upon the demand of the room for heating or cooling. Air-stream control prevents the discharge of air below a draft-free minimum temperature.

Adequate ventilation. The fixed minimum quantity of outdoor air to be introduced into the occupied area is determined by the position of the damper when the system is designed. Should changing ventilation requirements demand it, the damper position may be adjusted readily at the site.

Absence of objectionable drafts. Such drafts occur when heat removal or ventilation requirements are met by the use of too-high air velocities or too-low air temperatures. Thermovent's low-limit air-stream control assures discharge temperatures of a draftless minimum—usually 10° below room temperature. The problem of excessive air motion is eliminated by circulating large volumes of low-velocity air. High-velocity low-temperature air is never used for heat removal or ventilation.



FANS Large diameter, forward-curved fans operating at low speeds deliver more air with less noise. Maximum outlet velocity used in Nesbitt LP Thermovents, 1275 FPM.

PLENUM CHAMBER of large cross section lets air from fans expand, and reduces air velocity and sound level.

BAFFLE PLATES Covered with 1" thick glass fiber for extra sound absorption within the plenum chamber.

LINING of 1" thick bonded glass fiber over entire interior of plenum chamber. High sound absorption coefficient (average, .75 for frequencies 256 to 2048 cps.)

Total Sound Absorbing Surface, 12 to 18 sq. ft. per 1000 cfm, depending upon unit size.

BEARINGS Fan shaft bearings, self-aligning, sleeve type for quiet operation. Need oil only twice a year.

MOTORS Quiet-operating, two-speed, two-winding, sleeve bearing. Insulated from unit by a resilient mounting.

MOTOR isolated from air stream within a ventilated compartment — out of view, accessible for service, oiling.

The plenum and its lining reduce the noise level a minimum of 11 decibels.

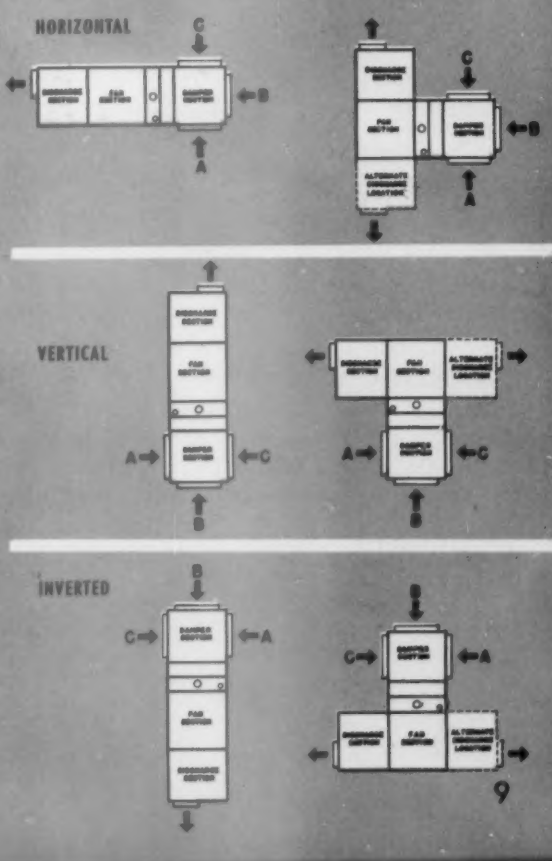
Quiet operation. To insure the quietness essential in most school assembly areas, Thermovent incorporates the following features: motors mounted on isolation bases and enclosed in the unit casing; high-volume, low-speed, multi-blade fans; low-velocity discharge; and an acoustically treated discharge section. This sound absorbing plenum is so designed that both high-frequency and low-frequency sounds are effectively reduced.

Heating Capacities, Types LP and HP — 2 lbs. Steam, 0° Outdoor Air

TYPE LP UNITS—LOW STATIC PRESSURE (UP TO ⅝" W.G.)		
MODEL NO.	STANDARD AIR CFM	SQ. FT. EDR
LP-100	10,000	2720 to 4810
LP-85	8,500	2310 to 4100
LP-70	7,000	1965 to 3380
LP-55	5,500	1620 to 2638
LP-45	4,500	1241 to 2150
LP-35	3,500	925 to 1650
LP-25	2,500	688 to 1196
LP-17	1,750	460 to 820
LP-12	1,250	332 to 600
TYPE HP UNITS—HIGH STATIC PRESSURE (¾" TO 1¼" W.G.)		
HP-150	15,000	3930 to 6450
HP-125	12,500	3340 to 5550
HP-100	10,000	2690 to 4400
HP-80	8,000	2115 to 3480
HP-60	6,000	1648 to 2675
HP-45	4,500	1217 to 1972
HP-35	3,500	932 to 1530

wide adaptability

Sectional construction permits separate units to be combined into a wide variety of arrangements for all practical needs.



NESBITT SILL-LINE RADIATION



wall-hung type

Nesbitt Sill-line Radiation incorporates all the benefits of high-capacity wall-fin radiation in the first sturdy enclosure expressly styled to harmonize with contemporary building design. Its graceful curves and modern lines complement any decorating scheme.

Convected air currents activated by the Sill-line heating element assure uniform temperatures from floor to ceiling and provide continuous warmth along extended window exposures. This effective perimeter heating overcomes cold downdrafts, serves to raise the temperature of the cold surfaces, and—along with its own radiant heating effect—helps to decrease the radiant temperature differential between room occupants and the chilling exposures.

Sill-line is easy to install, economical to operate, and widely flexible in application.

enclosures

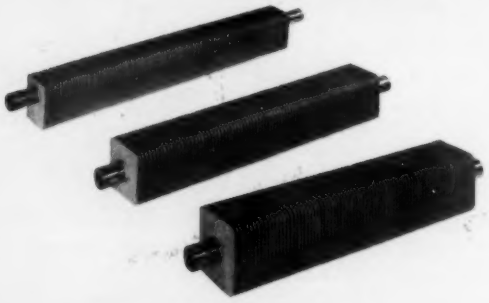
Wall-hung enclosures are die-formed of 16-gauge furniture steel. Corners are rounded; surfaces are smooth. The top louvered discharge grille and extruded inlet openings are integral with the one-piece front panel, internally braced for lasting service. A solid one-piece back panel supports the heating element and the enclosure top and bottom for the full ensemble length; assures proper alignment, simplifies installation. Enclosure lengths produce a neat end-to-end joint without butt straps.

Five enclosure types are available: Type A, 4⅛″ x 13″ for one-row Type A heating element; Type B, 5⅛″ x 14″ for one-row Type B heating element; Type C, 5⅛″ x 24″ for one- or two-row Type B element; Type D, 2⅜″ x 10″ for one row Type D element; and Type E, 5⅛″ x 20″, for one- or two-row Type B element.

Seven standard lengths from 2′ to 8′ combine into any overall length, with sleeves, without cutting on the site.

Enclosures have long-life baked enamel finish.

heating elements



The non-ferrous element consists of aluminum fins mechanically bonded to seamless copper tubing. The unique corrugated fin provides additional transfer surface, increases rigidity, eliminates sharp edges—is easier to handle and install. Type A heating elements have 3¼″ x 3¼″ fins on a nominal 1″ (actual 1⅛″) o.d. tube. Type B elements have 4¼″ x 4¼″ fins on a nominal 1¼″ (actual 1⅜″) o.d. tube. Type D elements have 2⅛″ x 2¾″ fins on a ¾″ nominal (⅞″ actual) o.d. tube.

Nominal standard lengths assemble into continuous runs of elements to any required overall length. Swaged tube ends permit quick jointing without couplings.

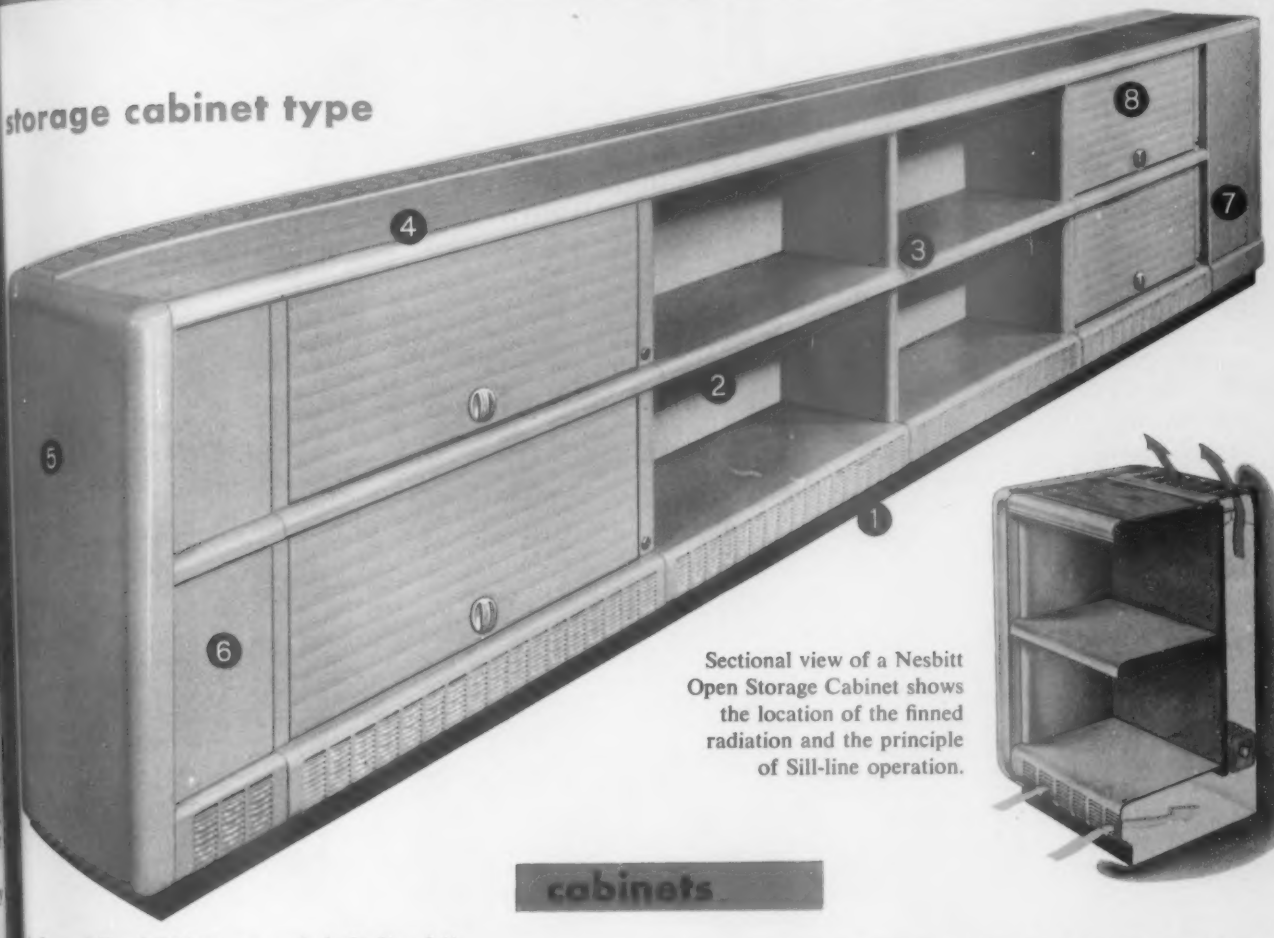
Sill-line may be employed in either steam or hot-water systems and is suitable for use with any type of manual or automatic control.

accessories

Attractive die-formed steel accessories include inside and outside 90° corners, 4½″ and 7½″ wall sleeves, a valve compartment, wall strip, and end caps to complete wall-to-wall ensembles, short-of-wall installations, or to continue the enclosure around right-angled corners. Knob-operated dampers, inlet grilles and a column enclosure are available, optional.



storage cabinet type





Sectional view of a Nesbitt Open Storage Cabinet shows the location of the finned radiation and the principle of Sill-line operation.

cabinets

1. Open and Closed Cabinets are made in 2′, 3′ and 4′ lengths; 28″ and 32″ heights, and may be integrated in various combinations into a continuous ensemble.

2. Wide, roomy open and closed storage shelves accommodate books and materials up to 11½″ high.

3. Cabinets are formed of sturdy 16 gauge furniture steel. All surfaces are smooth, easy to clean.

4. Laminated plastic sunboard and aluminum trim unite components into an integral assembly.

5. Smooth, rounded end panels finish the ensemble when termination short of the wall is desired.

6. Matching piping compartment provides space and access for control valves, piping or other accessories.

7. For wall-to-wall installations an adjustable fill-in section (for lengths up to 30″) permits a continuous ensemble and encloses piping, valves and accessories.

8. Doors on closed cabinet are of sturdy construction and modern design. Easily operated and fully recessed when open, they give complete access to the interior. Individual locks and keys are available.

For the many schoolroom and office installations which require practical storage space combined with a need for heating facilities along the outside wall and window surfaces, Nesbitt Storage Cabinets with Sill-line Radiation meets both requirements. Combining all the advantages of high-capacity finned radiation with quantity-produced, all-welded storage cabinets, this Nesbitt equipment offers for temporary or permanent buildings a low-cost heating-storage ensemble that is as outstanding in beauty as it is in economy.

Open and closed cabinets (of same height) can be joined to other cabinets, filler-pieces or piping compartments because bolt hole locations are uniform. Louvered discharge grille and rubber wall seal are supported entirely from the cabinet and built-in spacers on back of cabinets assure correct spacing and alignment. Insulation on cabinet backs prevents excessive temperatures in the storage spaces and results in heat savings. Recessed adjustable kick plates conceal slight variations in floor alignment. Grilles and kick plates may be removed for periodic cleaning.

SILL-LINE Heating Capacities—Btu per hour per lineal foot

Sill-line Type	Radiation Type	STEAM 1 PSIG	AVERAGE WATER TEMPERATURE °F 220	210	200	190	180	170	160	150
A	A	1400	1470	1330	1205	1090	965	855	740	630
B	B	1925	2020	1830	1655	1500	1330	1175	1020	865
B1	B	2225	2335	2115	1915	1735	1535	1355	1180	1000
B2	B	2675	2810	2540	2300	2085	1845	1630	1415	1205
D	D	700	735	665	600	545	485	425	370	315
B1	B	2150	2260	2040	1850	1680	1480	1310	1140	970
B2	B	2400	2520	2280	2060	1870	1650	1460	1270	1080

Sill-line capacities include factor for heating effect at installed height. Storage Cabinet capacities are true condensation ratings as determined by test. See Publications 102 and 261, Section S.

STORAGE CABINET Heating Capacities—Btu per hour per lineal foot

Cabinet Height	Fin Type	No. Rows	STEAM	FORCED HOT WATER—Average Water Temperature 160°	170°	180°	190°	200°	210°	220°	230°
32″	"A"	1	1450	768	884	1000	1130	1248	1377	1522	1665
		2	1830	970	1117	1262	1427	1575	1740	1921	2105
	"B"	1	1950	1032	1190	1345	1520	1677	1852	2047	2242
		2	2265	1200	1382	1563	1767	1950	2152	2378	2605
28″	"A"	1	1315	697	802	907	1026	1131	1250	1380	1512
		2	1690	896	1030	1166	1318	1453	1605	1775	1942
	"B"	1	1775	941	1082	1225	1385	1527	1687	1864	2040
		2	2075	1100	1266	1430	1620	1785	1972	2180	2385

Where to Buy NESBITT

HEATING AND VENTILATING PRODUCTS

The Enlarging Circle of **NESBITT** Heating and Ventilating Products

SALES OFFICE DIRECTORY, LISTED ALPHABETICALLY BY CITIES, FOR HEATING AND VENTILATING PRODUCTS MADE BY NESBITT

The Nesbitt Syncretizer, Nesbitt Wind-o-line Radiation, The Nesbitt Package, Nesbitt Thermovent, Nesbitt Sill-line and Sill-line with Storage Cabinets are sold through offices of the American Blower Corporation (ABC) and offices of John J. Nesbitt, Inc. (JJN) as follows:

City and State	Street Address	Telephone
ALBANY 7, N. Y. (JJN)	93 State Street, Room 43	Albany 6-7661
ALBUQUERQUE, N. M. (ABC)	112 W. Granite Avenue	3-2247
ALLENTOWN, PA. (JJN)	104 N. 7th Street	Hemlock 5-8331
ATLANTA 3, GA. (ABC)	3224 Peach Tree Road	Exchange 8604
BALTIMORE 18, MD. (JJN)	33 E. 21st Street	Belmont 5-5895
BIRMINGHAM 3, ALA. (ABC)	1638 Brown Marx Bldg.	7-2383
BOSTON 15, MASS. (JJN)	236 Huntingdon Avenue	Copley 7-4202
BRYN MAWR, PA. (JJN)	765 W. Lancaster Ave.	Lawrence 5-8585
BUFFALO 16, N. Y. (JJN)	1441 Hertel Avenue	Delaware 3739
CHARLESTON, W. VA. (ABC)	1029 Virginia Street	6-1331
CHARLOTTE, N. C. (ABC)	Commercial Bank Bldg. 200 South Tryon St.	3-8444
CHICAGO 1, ILL. (ABC)	228 N. LaSalle Street	Financial 6-2531
CINCINNATI 2, OHIO (ABC)	1005-6 American Bldg.	Parkway 8160
CLEVELAND 15, OHIO (ABC)	1010 Euclid Avenue	Main 1-6846
COLUMBUS, OHIO (JJN)	101 N. High St., Rm. 302	Capital 4-7559
DALLAS 2, TEXAS (ABC)	1213 Texas Bank Bldg.	Prospect 1879
DAYTON 2, OHIO (ABC)	3rd National Bldg.	Hemlock 2689
DENVER 4, COLO. (ABC)	1304 Cherokee Street	Main 3179
DES MOINES 9, IOWA (ABC)	506 Securities Bldg. 418 Seventh Street	4-1631
DETROIT 2, MICH. (ABC)	632 Fisher Building	Trinity 2-4300
EL PASO, TEXAS (ABC)	609 Laurel Street	3-7575
FT. WAYNE, IND. (ABC)	514 Gettle Building	Eastbrook 7673
GRAND RAPIDS, MICH. (ABC)	211 Assn. Commerce Bldg.	8-1357
GREENVILLE, S. C. (ABC)	105 Palmetto Building	2-4286
HARRISBURG, PA. (JJN)	835 S. 13th Street	Harrisburg 8-8144
HOUSTON 2, TEXAS (ABC)	1909 Travis Street	Preston 6171
INDIANAPOLIS, IND. (ABC)	619-21 Architects' & Builders' Building	Melrose 5-4521
JACKSONVILLE 1, FLA. (ABC)	110 Riverside Avenue	Elgin 6-1366
JOHNSTOWN, PA. (JJN)	206 Fisher Building	Johnstown 9-4108
KANSAS CITY 5, MO. (ABC)	330 Dwight Building 1004 Baltimore Ave.	Victor 7181
KNOXVILLE 8, TENN. (ABC)	223 Empire Building	4-1668
LOS ANGELES, CALIF. (ABC)	1105 Architects' Bldg. 816 W. Fifth Street	Michigan 3871
LOUISVILLE 2, KY. (ABC)	1622 Heyburn Building	Jackson 1027
MEMPHIS 3, TENN. (ABC)	668 South Main Street	8-0339

City and State	Street Address	Telephone
MEXICO CITY, MEX. (ABC)	San Jan deLetran #37 Apartado 403	
MIAMI 33, FLA. (ABC)	Box 291, Coconut Grove 3356 Virginia Street	46-3916
MILWAUKEE 3, WISC. (ABC)	231 W. Wisconsin Ave.	Broadway 1-6[illegible]
MINNEAPOLIS 3, MINN. (ABC)	402 Essex Building 84 S. 10th Street	Geneva 7[illegible]
NEWARK 2, N. J. (ABC)	Industrial Office Bldg. 1060 Broad Street	Market 2-[illegible]
NEW HAVEN 11, CONN. (ABC)	405 Temple Street	Spruce 7-[illegible]
NEW ORLEANS 12, LA. (ABC)	Room 305, Jahncke Bldg. 816 Howard Avenue	Tulane 7[illegible]
NEW YORK 7, N. Y. (JJN)	11 Park Place	Barclay 7-[illegible]
OMAHA, NEBRASKA (ABC)	305 Patterson Building 17th & Farnam Streets	Atlantic 7[illegible]
ORANGE, N. J. (JJN)	285 Main Street	Orange 3-[illegible]
PHILADELPHIA 36, PA. (JJN)	State Rd. & Rhawn St.	Devonshire 2-[illegible]
PHOENIX, ARIZ. (ABC)	Rm. 227, Central-Madison Bldg. 128 S. Central Avenue	Alpine 3-[illegible]
PITTSBURGH, PA. (JJN)	735 Castle Shannon Road	Locust 3-[illegible]
PORTLAND, ORE. (ABC)	The Pittock Block, Rm. 445 921 S. W. Washington St.	Atwater [illegible]
READING, PA. (ABC)	Medical Arts Building 230 N. 5th Street	6-3901
RICHMOND, VA. (JJN)	7 N. 6th Street	2-3365
ROCK ISLAND, ILL. (ABC)	210 Safety Building 1800 Third Avenue	6-6425
ST. LOUIS 1, MO. (ABC)	1711 Railway Ex. Bldg. 611 Olive Street	Garfield 1-[illegible]
SALT LAKE CITY, UTAH (ABC)	204 Dooly Building	4-6421
SAN FRANCISCO, CALIF. (ABC)	625 Market Street	Sutter 1-[illegible]
SCHENECTADY 5, N. Y. (ABC)	511 State Street	4-7503
SEATTLE 9, WASH. (ABC)	1305 Republican Street	Seneca 5[illegible]
SO. BEND, IND. (ABC)	211 Lafayette Building	3-9305
SPRINGFIELD, MASS. (JJN)	1537 Main Street	Springfield 2-[illegible]
SYRACUSE, N. Y. (JJN)	1105 State Tower Building	Syracuse 2-[illegible]
TAMPA 1, FLA. (ABC)	509 Twiggs Street	2-2506
TOLEDO 12, OHIO (ABC)	4359 Kingsbury Avenue	Lawndale 7[illegible]
TULSA 3, OKLA. (ABC)	817 S. Boulder Street	3-5223
WASHINGTON, D. C. (ABC)	Washington Building 15th & N. Y. Ave., N. W.	National [illegible]

In Canada these products are sold through Canadian Sirocco Company, Ltd., P. O. Box 360, 310 Ellis Street, Windsor, Ontario. Telephone: Clearwater 4-4353

For further information, sales assistance, or engineering data, contact the nearest office of John J. Nesbitt, Inc. or American Blower Corporation, or write direct.

PUBLICATION [illegible]
PRINTED IN U.S.A. [illegible]

Nesbitt

HEATING & VENTILATING EQUIPMENT FOR SCHOOLS

Made and sold by John J. Nesbitt, Inc., Philadelphia 36, Pa.
Sold also by American Blower Corporation

C-1/Sm.

FACTS

to consider when selecting the Boiler for Modern School Heating

MODERATE INVESTMENT

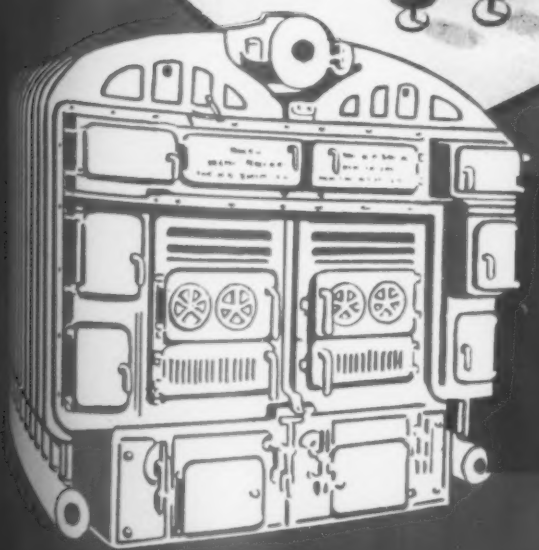
LOW FUEL COST

LONG LIFE

QUICK RESPONSE

ABILITY TO EXPAND AS THE SCHOOL GROWS

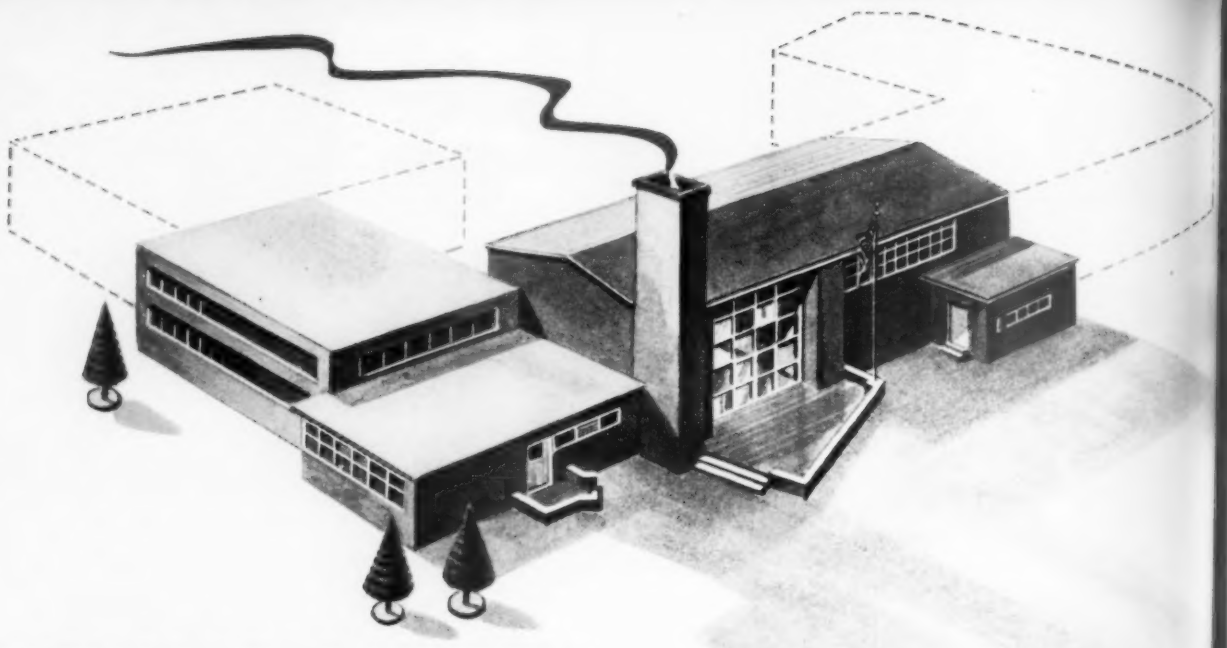
LOW UPKEEP



H. B. SMITH CO., INC.

Westfield Massachusetts

Established 1853



FUTURE NEEDS

exceed initial outlay in importance

The School Board, Committee or Architect to whom the planning of a new school is entrusted naturally undertakes great responsibilities.

Chief among these, most authorities agree, is the selection of the school boiler plant. Because the operation and maintenance of the boiler system represent by far the greatest single expense to be borne — for the entire life of the school — extreme care should be observed in making this choice. Over a 20-year period, for example, the amount paid for fuel will be many times the initial cost of the boiler.

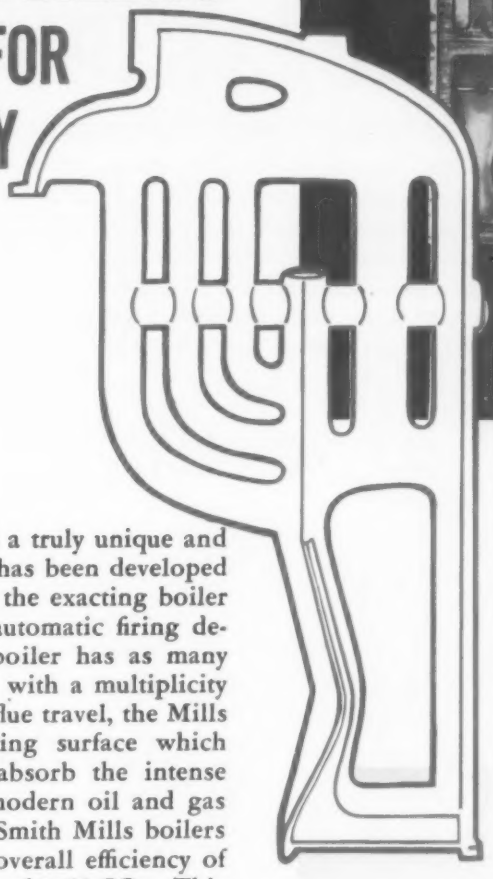
Too, the prudent planner will assume a perspective which allows a clear conception of the school's future development as regards boiler plant requirements. Many examples have illustrated forcefully that an advantage of perhaps only one hundred dollars in the boiler purchase price has proved to be false economy — a "s ing" far overshadowed by subsequent costly pairs or replacement.

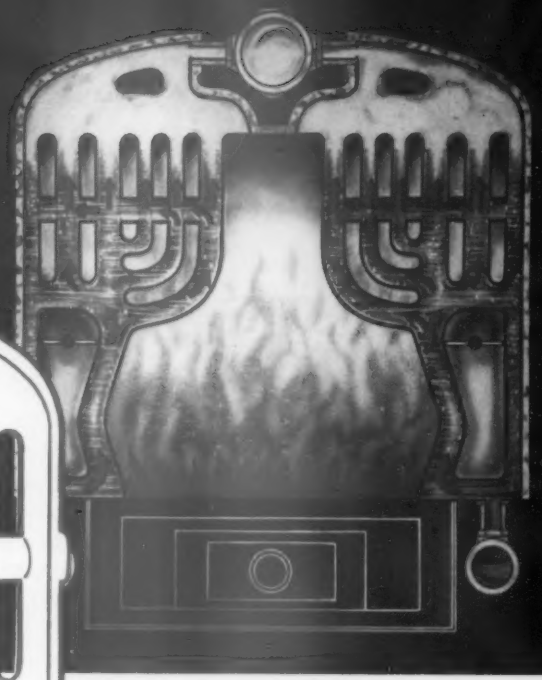
Economy of operation, low maintenance co long life, adaptability and ease of expansi therefore, should be prime considerations. T following pages show, by actual case histori how these and other important requisites are m by H. B. Smith cast iron boilers.



Typical school installation of an H. B. Smith oil-fired boiler showing compact size and absence of complicated controls.

H. B. SMITH BOILERS ARE DESIGNED FOR HIGH EFFICIENCY





Sectional view showing multiplicity of water tubes and prolonged flue travel. Note the extra heating surface for efficient absorption of intense flames generated by modern oil burners.

Left: Smith boiler section showing tubular design and large amount of heating surface.

The Mills Water Tube Boiler is a truly unique and different cast iron boiler which has been developed by H. B. Smith engineers to fill the exacting boiler plant requirements of modern automatic firing devices and systems. No other boiler has as many outstanding features. Designed with a multiplicity of water tubes and a prolonged flue travel, the Mills boiler provides the extra heating surface which must be present to efficiently absorb the intense heat-like flames generated by modern oil and gas burners. The ratings of H. B. Smith Mills boilers are conservatively based on an overall efficiency of 75% with combustion conditions of 10% CO_2. This indicates the high standard of performance which may be expected from these units.

LOWER CHIMNEYS WITH H. B. SMITH BOILERS

Because of the fact that H. B. Smith Mills boilers have such a large quantity of heating surface — more than any other boiler of comparable physical dimensions — it might well be expected that there would be greater draft loss through the boiler, and hence a higher chimney would be needed. Due to the unique Mills type design, however, actually the reverse is true. There is so little draft loss through the boiler that lower chimneys can be used and since it is not necessary for the school architect to restrict his choice either to conventional boilers with high disfiguring chimneys or units requiring complicated induced draft mechanisms which are difficult to keep in adjustment.

H. B. SMITH BOILERS READILY CONVERTIBLE

Today most H. B. Smith boilers are installed with automatic firing devices. Still they may be converted to hand fired solid fuels, if it should be necessary to do so. Many H. B. Smith boiler owners were especially pleased with this convertible feature during the War when it often was necessary to shift from oil to fuel.

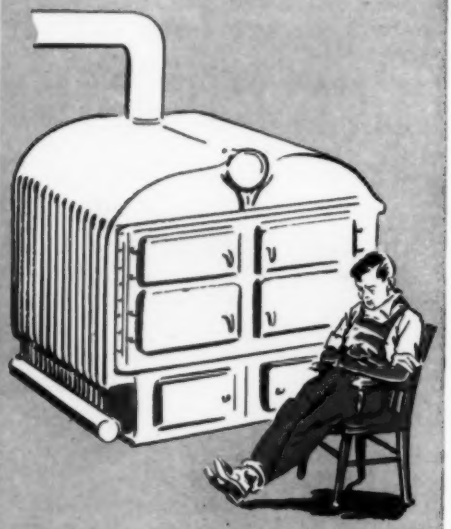


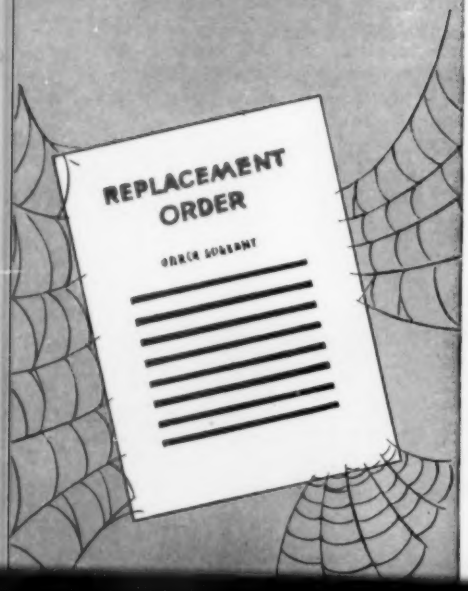


Above: Clarksville, New York's Junior and Senior High School is an example of a recent installation, as is the Elementary School of Burlington, Connecticut, below. These schools were selected by the Architectural Forum and Architectural Record, respectively, as the two outstanding schools of their size.

PERSONAL SURVEY PROVES LONG LIFE AND LOW-COST MAINTENANCE OF H. B. SMITH CAST IRON BOILERS







In the spring of 1950, The H. B. Smith Company decided to conduct a very extensive survey to determine boiler maintenance costs. To accomplish this, it was decided to visit personally every school installation of H. B. Smith boilers within three adjoining counties in New England. None of these counties contained a city of over 200,00 people.

81 SCHOOL BUILDINGS SURVEYED

A man was assigned to this task. He, personally, visited every school boiler room in this area in which an H. B. Smith boiler was installed and made a thorough check as to its age and past history. He visited 81 school buildings in which were installed 119 H. B. Smith header type cast iron boilers. These boilers, of course, had been installed for varying periods of time, and averaged 24.1 years in age. Breakdown by age is as follows:

10 years and under	14
11 – 20 years	18
21 – 30 years	58
31 – 40 years	24
41 – 50 years	5

FAILURE CHANCES VERY SLIGHT

These boilers had a combined total of 3,176 sections. In the complete time that they have been installed, 39 sections have been replaced. The causes of these failures are as follows:

Low water	28
Flood waters	5
Strain in setting	3
Factory defect	1
Freeze-up	1
Plugged nipple	1

It should be noted that low water accounted for the great majority of these failures. This is a condition, of course, that is entirely due either to the failure of automatic protective devices or, what is more likely, the negligence of the man having charge of the firing or maintenance of the boiler. In only one case — a bad low water situation — had enough sections cracked to require a shutting down of the boiler plant. In all other cases the cracked sections were cut out, the headers plugged, and the boilers continued in operation until section replacement could be made in the summer.

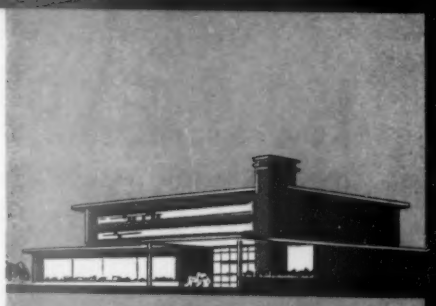
What is truly amazing is the fact that, even with this ordinary human factor taken into consideration, only 39 sections cracked during this entire period for all types of reasons. To put this another way, with an H. B. Smith cast iron sectional boiler, there is an average section loss of 1.23% or only one chance in 81 that a section will be lost in any given year, and only one chance in three that even as much as a single section will be lost in 24 years of operation.

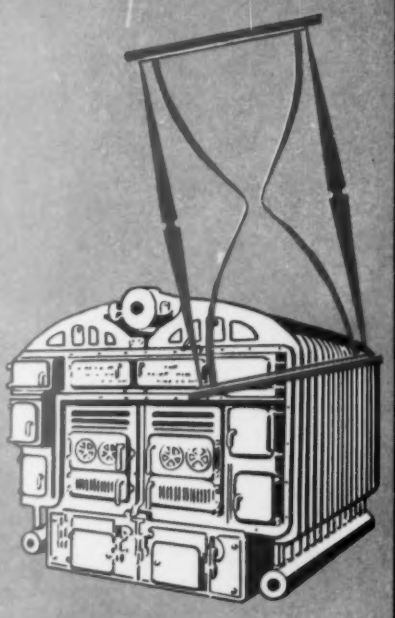
SPEND SCHOOL FUNDS FOR EDUCATION

Of course, most school departments reported that it was necessary to make minor repairs on their older boilers from time to time, such as furnishing new grates for coal-burning boilers, and minor items of trim, such as doors, door frames, etc. In all cases, however, these repairs were such minute items that they were always absorbed out of cash funds. It was never necessary to make any special requests to the school department or to the city for major repairs, such as replacements of steel boiler tubes. This, of course, has resulted in a very favorable feeling by school department officials who prefer to use their funds each year for educational benefits. No school department likes to have to spend its funds in constant repairs to its plant where such expense merely renews existing facilities and does not contribute to doing a better educational job. Over a period of years, with a school department running several or many schools, this saving amounts to a very appreciable sum of money.

OLD BOILERS STILL GOING STRONG

In connection with this survey, it was interesting to note that the older boilers studied; that is, those over 30 years old were all in good condition and replacements were not being considered by the school departments interviewed. In other words, this older equipment was doing a good job and still had many years of useful life ahead.







These two cast iron Smith-Mills boilers were installed in 1884, the year of Grover Cleveland's first election to the presidency. Now, some 66 years later, they still perform with customary efficiency, even though the only repairs they have undergone have been the replacement of a few grate bars.

HOW EXPANSION FEATURE OF SMITH BOILERS SAVED TIME AND MONEY FOR TWO SCHOOLS





The original cast iron boiler of the East Wil ton, N. Y., North Side School (built in 191 was replaced in 1921 by an H. B. Smith boil When an addition to the building was co structed in 1925 a second Smith boiler was in stalled.

Another new wing was added in 1929 and t boilers were expanded from two 9-section two 12-section 60 Smith series to provide for th new heating load.

The boilers were hand-fired, but in 1935 on was converted to stoker firing, using bitumino coal, and it was found that this boiler was lar enough to carry the load in mild weather.

In 1949 a new wing was added, consisting of eight classrooms, a kinde garten, athletic dressing rooms, fully equipped cafeteria, reference libra teachers' room, clinic, office and supply room. The boilers again we increased, this time from 12 to 14 sections each, and were converted t burning heavy oil.

The original sections of each boiler — after 29 and 25 years of service — are still in use today.

Many dollars were saved by the District through the use of Smith cast iro boilers, since only additional sections were necessary each time the buildi was enlarged, whereas if a steel boiler had been used originally it wou have necessitated the purchase of another complete boiler. Also, difficul would have been experienced in bringing in the second steel boiler due t insufficient entry space to the building. Then, to complete the buildi program it would have been necessary to install a third boiler (instead the present two) at considerable expense, and again make extensive co struction changes to bring the boiler into the building and to provide add tional boiler room space.

PENN WYNN ELEMENTARY SCHOOL'S BOILERS KEEP PACE WITH ADDITIONS

Two10-section oil-fired 60 Smith boilers were original equipment in the Elementary School at Penn Wynn, Pa., when it was built in 1930.

In 1949 the school was expanded, and the boilers were increased to 26 sections each. At this time one boiler remained in service while the other was enlarged, and the larger boiler took over the job while the second boiler was increased in size; thus service was not interrupted. The only new parts furnished — besides new nipples — were those required to increase the capacity.

The Engineers, Architect and School Board had considered installing two steel boilers to take over the increased load since they felt that the cast iron boilers had given all the service which should be expected of them. But an inspection revealed that the Smith boilers would be good for at least another 20 years and it was decided to expand the original units — a decision that meant a saving of $3,724.



EXPERIENCE OF SIMSBURY SCHOOLS TYPICAL OF SMALL-TOWN SYSTEMS

Typical of the experience of the small-town school systems using H. B. Smith boilers is that of Simsbury, Connecticut, where three of the four schools rely on H. B. Smith installations.

In the High School an H. B. Smith unit has been in service since the school was built in 1907, with no major repairs having been necessary. When the school was enlarged in 1927 a second Smith boiler was installed. These burned coal until the mid-30's when they were converted to oil. This fuel was used until the war, when coal stokers were employed, and the system was reconverted to oil following the war.

The next oldest H. B. Smith installation is in the Central Grammar School where a Smith boiler has been in use since the school was built in 1913. This was supplemented by a second Smith unit when the school was expanded in 1918. In 1946 the original boiler was cleaned, overhauled and renippled at a total cost of $594, and is now good for another 20 years of service.

The original boiler of another make, installed when the South Grammar School was built in 1927, was replaced in 1939 by an H. B. Smith boiler, and this has not required service or repairs since.

Thus over a total period of 146 H. B. Smith boiler years in Simsbury schools, the amount spent for repairs has been only $594 (and this on a single boiler after 33 years' service) — an average maintenance cost of about $4 per year for the five Smith boilers in the school system, with no outlay to be made for repairs in the immediate future.

The Tarrifville Grammar School, fourth in the Simsbury system, is equipped with a cast iron boiler of other manufacture. The oil consumption for this school is at the rate of 4.77 gallons per square foot of steam radiation per year. The average of the other three schools with H. B. Smith boilers is 3.92 gallons per square foot per year. In other words, the H. B. Smith boilers use 18% less to operate than do the other boilers.

Not only may this small-scale example be multiplied to illustrate the comparable economy of H. B. Smith boilers in large-city school systems, but it should be remembered that the savings remain effective for the many years during which Smith boilers are supplying virtually maintenance-free service.





Right: Long-service H. B. Smith boiler installation in Simsbury High School, Simsbury, Connecticut. School building is shown above.





BRANCH OFFICES

BOSTON	PHILADELPHIA	NEW YORK
104 Hanover Street	1612 Market Street	331 Madison Avenue
Phone Capitol 7-2933	Phone Rittenhouse 6-9828	Phone Vanderbilt 6-6076

INDEPENDENT MANUFACTURERS' AGENTS AND DISTRIBUTORS

ALBANY, N. Y.
O. F. Hawn
7 Academy Rd.

GENEVA, N. Y.
Jack F. Dwyer
16 E. Castle St.

SYRACUSE, N. Y.
H. V. Boggs Co.
419 E. Jefferson St.

BUFFALO, N. Y.
Landers Engr. Co.
170 Franklin St.

MECHANICSBURG, PA.
George A. Heath
40 W. Main St.

PITTSBURGH, PA.
D. H. Thiele
940 Western Ave.

BALTIMORE, MD.
A. E. Thain
2116 Mt. Holly St.

WASHINGTON, D. C.
A. W. Nugent & Co.
8519 Glenview Ave.
Takoma Park, Md.

RICHMOND, VA.
Frank Turner & Co.
7105 Hermitage Rd.

CHARLOTTE, N. C.
John J. Weeks
1527 E. Fourth St.

MINNEAPOLIS, MINN.
Robert F. Wittren
2915 James Ave., So.

ATLANTA, GA.
Edward W. Klein & Co.
152 Nassau St., N.W.

TAMPA, FLA.
O. H. Howell Mfg. Agent, Inc.
1605 Franklin St.

CLEVELAND, OHIO
R. J. Paulin Co.
1836 Euclid Ave.

COLUMBUS, OHIO
Jordan Equip. Co.
1373 Grandview Ave.

FORT THOMAS, KY.
Stanley M. Rankin
58 Broadview Place

FORT WAYNE, IND.
James F. Chapman, Jr.
R. R. #12
Lincoln Highway East

GRAND RAPIDS, MICH.
Kress Engr. & Sales Co.
1342 Burton St., S.E.

DETROIT, MICH.
W. W. Watson
Box 91
Clarkston, Mich.

CHICAGO, ILL.
Lavaty Engr. Co.
205 W. Wacker Drive

BIRMINGHAM, ALA.
Palmer & Lawrence
3110 Clairmont Ave.

ST. LOUIS, MO.
Russell J. Smith, Inc.
1601 So. Grand Blvd.

KANSAS CITY, MO.
Heaven Engr. Co.
1529 Wyandotte

BUTTE, MONTANA
Sullivan Valve & Engr. Co.
910 So. Arizona St.

SAN ANTONIO, TEXAS
Langhammer-Rummel Co.
300 Blum St.

HOUSTON, TEXAS
Langhammer-Rummel Co.
7607 Moss Rose St.

FORT WORTH, TEXAS
J. D. Higgins Co.
3816 W. Biddison St.

NORTH HOLLYWOOD, CALIF.
Pacific Engr. Equip. Co.
7247 Atoll Ave.

OMAHA, NEBRASKA
W. A. Goll & Assocs.
220 So. 79th St.

DES MOINES, IOWA
Tom Rae
1074 Thirty-First St.

KNOXVILLE, TENNESSEE
Tenn. Htg. Sales Co.
1311 Broadway, N.E.

SAN FRANCISCO, CALIF.
Price Bolton
823 Golden Gate Ave.

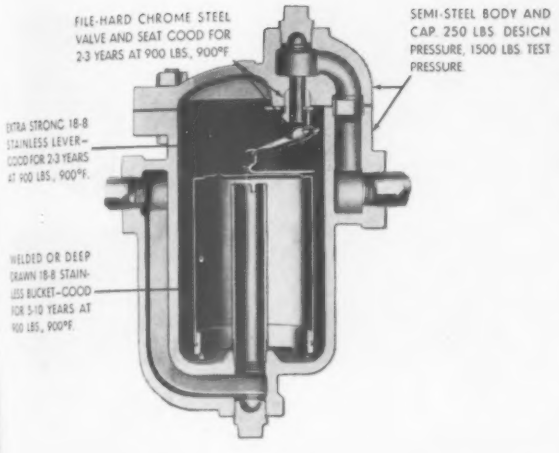
THE H. B. SMITH COMPANY, INCORPORATED
WESTFIELD • MASSACHUSETTS
Established 1853
THE MOST COMPLETE LINE IN THE WORLD OF CAST IRON

ARMSTRONG MACHINE WORKS

953 Maple Street, Three Rivers, Michigan

"Satisfaction Guaranteed"

ARMSTRONG STEAM TRAPS For Draining Low Pressure Heating Systems, Low, Medium and High Pressure Piping and Equipment.



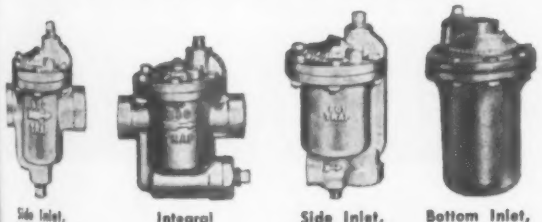
Look at this trap. Only two moving parts are inside. It's non-clogging, non-sticking, made of corrosion resistant materials. It will provide trouble-free service for years and years and years.

The mechanisms in Armstrong Traps for low and medium pressure service are identical in design, materials and workmanship to the mechanisms used in the Armstrong Forged Steel traps for 900 lbs. pressure and 900 deg. F service. This top quality construction insures years and years of maintenance free service, at low and medium pressures. Savings in steam and maintenance justify replacing ordinary low pressure traps with Armstrongs.

Save fuel . . . get faster heating . . . higher temperatures . . . lower trap maintenance . . . longer trap life by using Armstrong inverted bucket steam traps. There are traps to drain all classes of steam heated equipment including:

- Low pressure vacuum return heating systems
- Coffee urns
- Steam tables
- Vegetable steamers
- Dish warmers
- Jacketed kettles
- Hot water heaters
- Stills
- Unit heaters
- Radiators
- Power plant piping
- Pipe coils
- Steam lines
- Risers
- Laundry equipment
- Sterilizers
- Etc.

TRAPS TO MEET EVERY REQUIREMENT



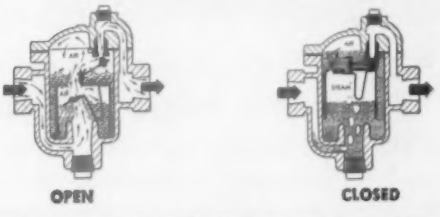
Side Inlet, Side Outlet — Integral Strainer — Side Inlet, Bottom Outlet — Bottom Inlet, Top Outlet

Four different body styles, ½" to 2" pipe connections, pressures to 250 lbs, capacities from 0 to 20,000 lbs/hr.

Integral strainer traps—These traps cost less than a trap and separate strainer and save on fittings and installation labor, too. Three sizes, pressures to 250 lbs, capacities to 2,200 lbs/hr.

Y-type pipe strainers—6 sizes (¼" through 2") made of cast semi-steel for pressures to 250 psig. These strainers feature a corrosion-resistant stainless steel screen (either perforated .045" dia. holes, 225 per sq. in. or 20 x 100 wire mesh), a blow-out proof metal clad-asbestos gasket for a leak tight seal and straight bushing threads allowing easy removal of screen. Steel strainers for pressures to 900 psig are also available.

FOR FAST HEAT UPS IN LOW PRESSURE VACUUM RETURN HEATING SYSTEMS



OPEN — CLOSED

Quick purging of air when the heat is turned on insures fast heat up. The bi-metal thermic strip holds the large vent open allowing accumulated air to rush through. When steam enters the bucket, the thermic strip closes the large auxiliary vent. The smaller vent then keeps the lines free of air that accumulates during operation.

SEND FOR CATALOG J.

The Armstrong Steam Trap Book gives complete information on Armstrong Traps, explains trap selection and installation. Send for your copy—no obligation.



HUMIDIFIERS

Models and sizes to meet all requirements. For laboratories, central heating ducts, storage rooms, etc. Helps fight colds, makes students, teachers, workers, more comfortable, keeps hygroscopic materials from changing moisture content. Easy to install, humidistat operated, pennies a day cost. Send for Bulletin No. 500.

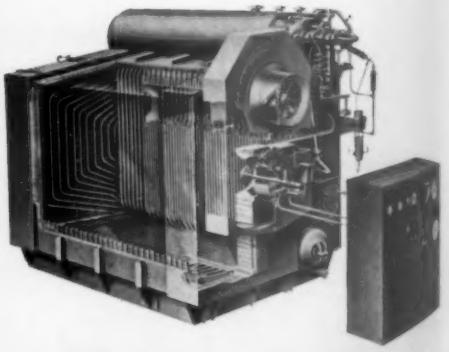
THE BABCOCK & WILCOX COMPANY

BOILER DIVISION

161 E. 42nd Street, New York 17, N. Y.

LOW-COST STEAM

for school requirements from 2900 to 50,000 lb/hr

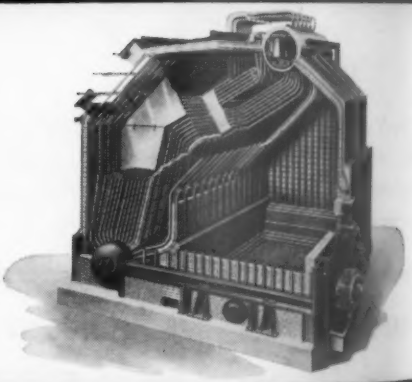


TYPE FM

Complete shop-assembled boilers delivered ready to skid or lift into position and start operating. Suitable for oil and gas firing.

Long established as the leading choice of American schools and universities, B&W Boilers of the types illustrated, covering a wide range of steam requirements, are *service-proved . . . your proof* of lower steam costs combined with higher service life. This user endorsement is your strongest possible assurance of B&W reliability and economy.

Before planning your next installation, check with B&W for the boiler best suited to your needs. These units are available for all standard fuels, and B&W can also meet your requirements should conditions demand the use of special fuels. Write for illustrated bulletins covering the B&W Boilers in greater detail. The Babcock & Wilcox Company, Boiler Division, 161 E. 42nd Street, New York 17, N. Y.

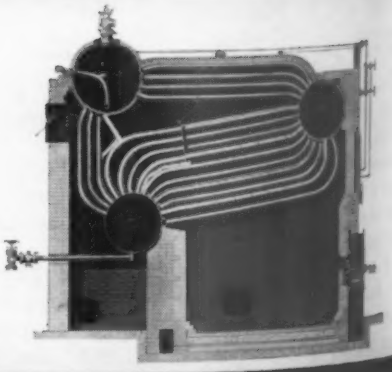


TYPE FF

Self-contained boiler incorporates the latest advances used in high-capacity steam generation, but is standardized for low cost. Suitable for coal, oil, or gas firing.

COST SAVING FEATURES

- Minimum floor space and headroom requirements.
- High fuel economy.
- Smokeless combustion.
- Adaptable to all fuels and firing methods.
- Clean, dry steam at all ratings even with high boiler water concentrations.
- Quick response to wide and heavy load swing demands.
- Easy to inspect and clean.
- High availability with least attention.



TYPE H

Boilers available for any steaming capacity needed to meet normal school requirements. Suitable for coal, oil, or gas firing.

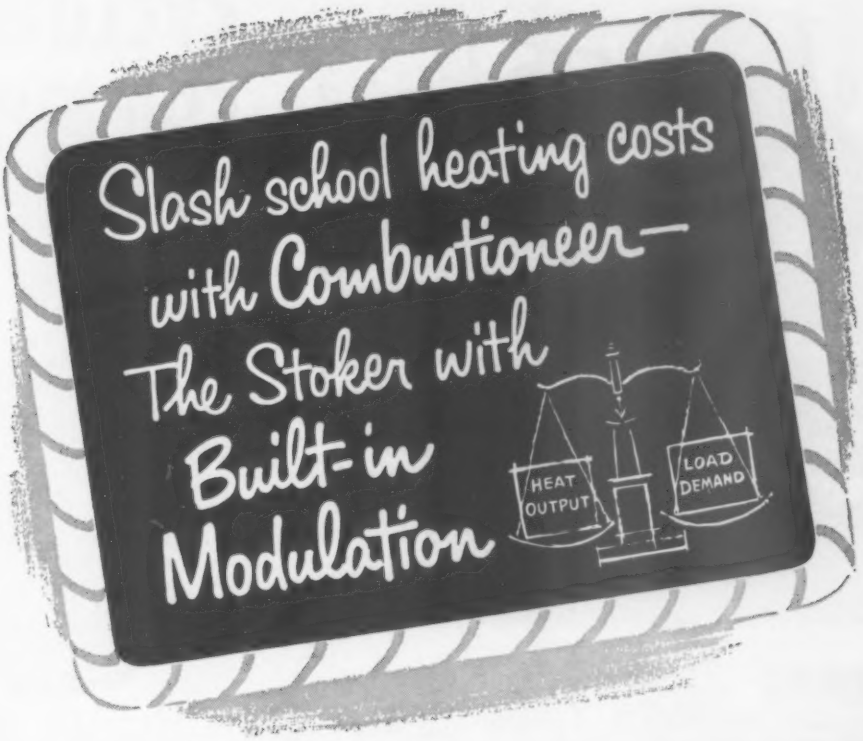
BABCOCK & WILCOX

BOILER DIVISION

G-616

COMBUSTIONEER DIVISION
THE STEEL PRODUCTS ENGINEERING COMPANY

1234 West Columbia Street, Springfield, Ohio



BURN COAL—
Save Fuel, Save Time, Save Money!

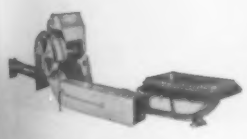
COMBUSTIONEER'S MODULATION automatically feeds coal and air to the fire at *variable* rates to meet load requirements, starting slowly, accelerating, tapering off, or stopping as the load demand changes. This levels off peaks and valleys in feeding, prevents over-firing and waste of coal!

Combustioneer Modulation can be obtained at savings up to $500 per stoker over other makes.

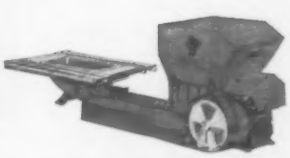
Furthermore, Combustioneer's agitating transmission and automatic respirator assure maximum combustion efficiency and smoke-free stacks. Heat output is always balanced with load demand.

Combustioneer Hopper and Bin-Feed Models range in capacity from 9 to 1000 lbs. per hour. They are precision made, rugged, giving long life in hard service.

Write today for Heating Manual giving complete data and specifications



Bin-Feed Model No. 15



Hopper Model No. 50



COMBUSTIONEER DIVISION
THE STEEL PRODUCTS ENGINEERING COMPANY
1234 West Columbia Street, Springfield, Ohio

Combustioneer®

GAS BURNERS • HIGH AND LOW PRESSURE OIL BURNERS
OIL FURNACES • STOKERS • HUMIDIFIERS

CYCLOTHERM

DIVISION UNITED STATES RADIATOR CORP.

Oswego, N. Y.



CYCLONIC COMBUSTION'S GREATER POWER...

...means

GREATER ALL-ROUND ECONOMY!

Cyclonic Combustion, revolutionary new flame control used exclusively in Cyclotherm Steam Generators, produces 66% more power per sq. ft. of heating surface . . . reduces heating space requirements from 5 to just 3 sq. ft. per boiler horsepower. This means compact Cyclotherm generators with complete fibre glass boiler insulation save up to one-third the space required for conventional generators . . . important where no basement is available and space is at a premium.

Cyclotherm generators eliminate the need for stacks, boiler foundations, extra insulation and excavation. Cyclotherm arrives complete . . . 5 easy connections—fuel, electricity, water, steam and a simple flue—and Cyclonic Combustion is ready to generate steam for any purpose.

Cyclotherm uses less fuel because the Cyclonic flame consumes every particle of fuel in the combustion chamber—itself a complete heat transfer unit. Burning gas or oil, Cyclotherm's smokeless combustion attains such a high rate of heat transfer that just a single pass of return tubes is required to deliver greater than 80% efficiency.

The simple construction of Cyclotherm generators saves up to 50% on maintenance cost and time. The main combustion chamber is automatically swept clean by the revolving vortex of flame—the single pass of return tubes is easily accessible by a door on the rear of the Cyclotherm. Inspection and cleaning is a minor operation with no time loss caused by boiler shutdown.

On large installations where requirements exceed 500 HP, sizable fuel savings can be obtained by battery installation. Based on analysis of your steam requirements, a number of units would be recommended which collectively add up to your peak steam demand. An automatic battery control panel distributes the load for maximum operating economy and brings in additional steam generating capacity as needed. Cyclotherm boilers are designed for 18 through 500 HP, 15 to 200 psi operating pressure.



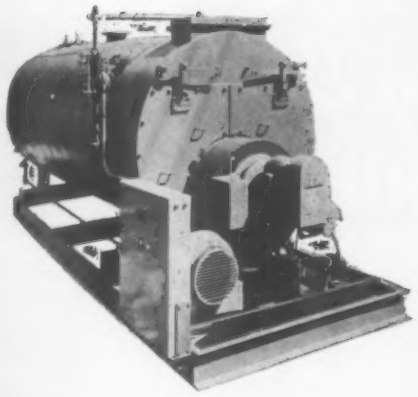
For more information about Cyclonic Combustion, write 4500 E. First St., Oswego, N. Y.

FARRAR & TREFTS, INC.

Established 1863

20 Milburn St., Buffalo 12, N. Y.

Sales Offices in Principal Cities



INSTALLATION OF 3000 SERIES BOILER

BISON SUPER-SCOT BOILERS

for the most efficient

3000 SERIES PACKAGED HEATING UNITS

1005-16,750

oil, gas, combination oil-gas

Ideal boiler–burner units with any manufacturer's burner equipment. Special design features have been embodied for efficient, simplified operation.

Elimination of refractory in rear combustion chamber does away with time consuming shut-downs for bothersome refractory upkeep and repairs.

Steel base frame for support of any suitable burner assembly. The frame also facilitates moving the boiler to its location and simplifies foundation work–only a flat floor slab is required for all but the largest of the 3000 series.

OUTSTANDING FEATURES AND ADVANTAGES

WET FRONT FURNACE—Front end of furnace, with water all around, is flush with front of boiler. Burner can be connected to fire directly at water heating surface, without heat loss.

COMPLETE WET BACK—Entire combustion chamber surrounded by water . . . the most efficient and quickest way of converting water to steam. No heat waste in rear . . . cooler boiler room.

The two-pass design is the old tried and true method of getting best distribution of heat transfer with low stack temperatures. At the same time, two-pass design gives easy access to tube areas to simplify internal inspection and minimize expense of maintenance and cleaning.

Large water and steam space works for smooth operation–with steady pressure and constant heat even during periods of peak demand.

COMBUSTION VOLUME—Proportioned for high efficiency. Tubes are sized for best flue gas velocity; fast water circulation is obtained with our modern design; front doors are pressure tight for mechanical draft. All these factors result in highest overall efficiency and a saving in fuel cost.

FIELD ASSEMBLED UNIT—Boiler and Burner package are shipped separately for certain advantages . . . boiler can be laced on its foundation before the building is closed in. The more delicate burner equipment can be protected in the mean time. Handling of separate units eases the problems of erection and gives a flexibility in selection of the burner.

FACTORY ASSEMBLED UNIT—Boiler and Burner package are integrated before shipment also supplied.

OTHER F & T BOILERS

BISON—Compact, Firebox, Two-Pass; Scotch Dryback, Utility Scotch, Horizontal Return Tubular

F & T Boilers Built to ASME Code, S.B.I., and State and Insurance Inspection Requirements

FEDDERS-QUIGAN CORPORATION

HEATING DIVISION

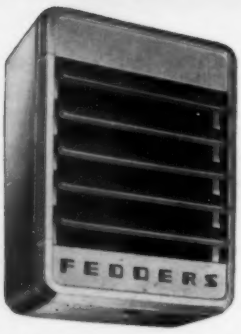
Lalor & Hancock Streets, Trenton 7, N. J.

Heat Transfer Specialists Since 1896

FEDDERS 1955 LINE

of Heating and Cooling Equipment

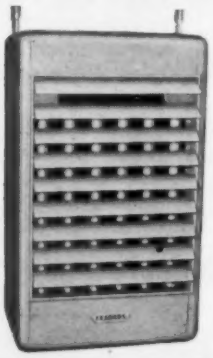
for Schools and Institutions



FEDDERS SERIES 17 UNIT HEATERS combine handsome cabinets and quiet reliable efficient performance.



FEDDERS SERIES 16 DOWNBLOW UNIT HEATERS for high mounting and spot locations. Available with radial louvers, cone and Anemostat diffusers. Wide range of capacities.



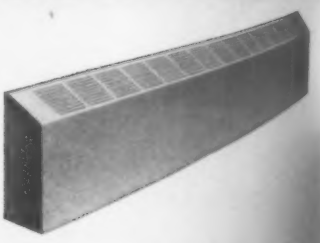
FEDDERS SERIES 18 GAS-FIRED UNIT HEATERS are self-contained and require no boilers and long runs of steam lines. 183 to 833 sq. ft EDR.



FEDDERS CODE APPROVED CONVECTOR-RADIATORS are being installed in schools, hospitals and churches.



FEDDERS I-B-R APPROVED BASEBOARD RADIATION . . . new functional design blends with any room decor. Dampers standard equipment. Quick, easy installation.



FEDDERS WALL RADIATION for easy installation and neat appearance. Choice of steel fins and tube or aluminum finned copper tube.



FEDDERS CONTINUOUS CONVECTOR-RADIATORS for installation under rows of windows and long runs found in large rooms and corridors. High capacity copper-aluminum heating element gives maximum heat transfer per foot. Interlocking cabinets have sloping top. Heavy gauge institutional models available. Shipped as package units.

IN design, in output, in rugged strength, — Fedders products are built for hard use in schools and institutions. Capacities and dimensions meet architectural, structural and piping requirements. Performance proven in thousands of installations. Sold nationally. Write for catalogs giving working data.

FEDDERS-QUIGAN CORPORATION

Dept. AS-5

HEATING DIVISION Lalor and Hancock Streets TRENTON 7, N. J.

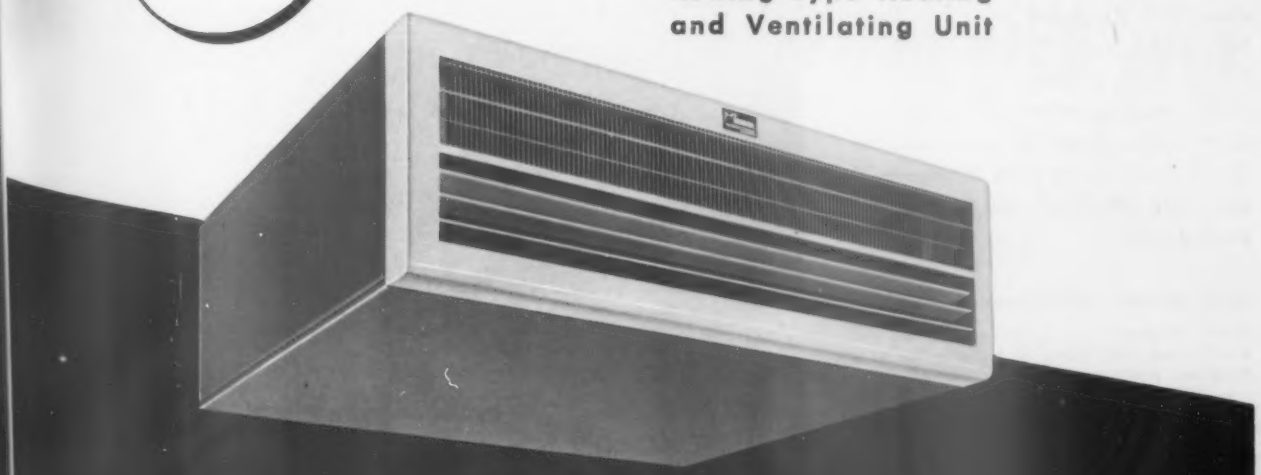
THE RUSSELL R. GANNON CO. INC.

Cincinnati 12, Ohio

Gannon

THERMOFUSE

Ceiling Type Heating and Ventilating Unit



THE ANSWER TO THE HIGH COST OF HEATING SCHOOLS

The Gannon Thermofuse Ceiling Type Heating and Ventilating system provides students and teachers with invigorating outdoor-air, reduces afternoon sluggishness, and improves learning efficiency of children of all ages.

This sytem, developed after 14 years of research in laboratories and schools, gives a masterful year-round performance. In winter it serves as an efficient heating system by recirculating classroom air, through heating coils. This air when blended with fresh outdoor air, pressurizes and heats the classroom evenly. In spring, summer and early fall, the Gannon Thermofuse converts to an air conditioner by circulating cold water through the heating coils.

The Gannon Thermofuse is streamlined in appearance—designed for any school, new or old. The unit is located on the ceiling at the inside wall, diffusing the conditioned air over the entire classroom and blanketing the outside wall and windows without drafts. It is an approved system which meets all code requirements.

COSTS LESS TO INSTALL THAN ANY OTHER SYSTEM: . .

The Gannon Thermofuse is easy on your building or remodeling budget. No major building alterations are necessary, as the design permits the use of small pipes with either one- or two-pipe hot water or steam systems. Wiring is simple and the temperature regulation is built into the unit and does not require separate contract installation.

When the Thermofuse Unit is used in new-building projects the contractors time is cut considerably because this system requires no roughing in. The contractor doesn't have to appear on the job until other trades are out of his way.

The Gannon Thermofuse Unit is being installed for less than $1,500 per classroom, as compared to the national average of approximate $2,500.

For detailed information on Thermofuse and other Gannon heating and ventilating units, WRITE THE RUSSELL R. GANNON CO. INC., CINCINNATI 12, OHIO. There's no obligation , of course.

THE INTERNATIONAL BOILER WORKS CO.

200 Birch Street, East Stroudsburg, Pennsylvania

Boiler Builders Since 1886 **Sales Offices in Principal Cities**

INTERNATIONAL WATER TUBE BOILERS

INTERNATIONAL Water Tube Boilers are built for the heating requirements of every school and university regardless of size. A typical example is the Joliet Township High School and Junior College, Joliet, Illinois, with a total enrollment of 3,200 students, where all heating is done with three International induced draft boilers with assurance of maximum efficiency and lowest operating cost.

OUTSTANDING PERFORMANCE

Quick Steaming . . . the steeply inclined water tubes carry steam to boiler outlet in a rapid and continuous flow.

Unusual Overload Capacity . . . mechanically fired International Water Tube Boilers provide extra capacity for heavy overloads. Normal continuous operation at 175-200% of nominal (hand fired) rating is not uncommon when the boilers are mechanically fired.

Maximum Heat Absorption . . . cross flow of gases over the tubes in long three pass travel effects marked savings by using more of the heat released by the burning fuel.

DEPENDABLE CONSTRUCTION

Every International Boiler is built in strict accordance with the ASME Code and all State Insurance Inspection requirements.

Complete Range of Sizes . . . type C Boilers in SBI rated sizes, from 2,200 to 42,500 sq. ft. steam. Capacities to 70,000 sq. ft. with type IDL Induced Draft Units.

Packaged Units . . . completely coordinated factory fire-tested Package Units, Type PL, are available in standard sizes from 4,400 to 70,000 sq. ft. steam.

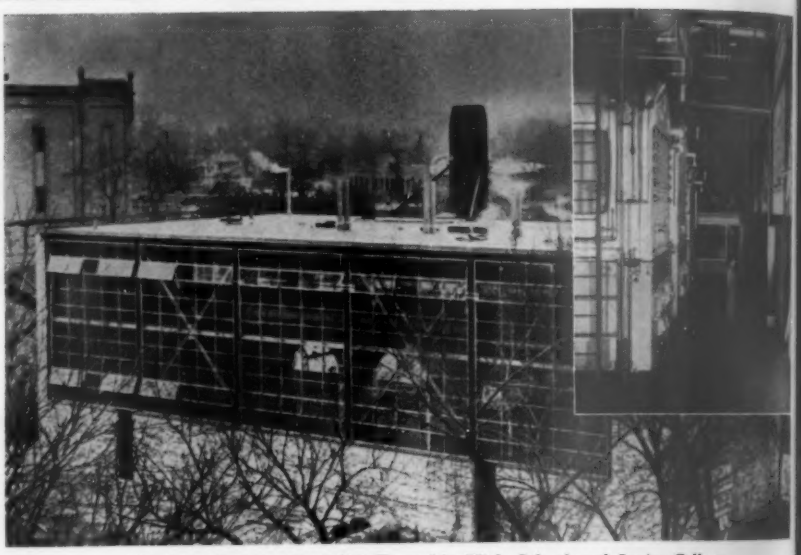
Member

SBI

Reg. U. S. Pat. Off.

For descriptive catalog write to:

THE INTERNATIONAL BOILER WORKS CO.
200 Birch Street
East Stroudsburg, Pennsylvania



Heating Plant for the Joliet Township High School and Junior College, Joliet, Illinois. Inset shows the 3 husky International oil fired Boilers, with a total capacity of 21,000 sq. ft. steam E.D.R.

peak performance at low cost

For new schools or existing school renovation, International offers three boiler types. For buildings with adequate entry there's the type C Boiler which features turbulent, three-pass gas travel over the water tubes . . . the key to high overload capacity and real fuel savings.

replacement boilers save cutting building walls

When the limiting dimension for entry into the boiler room is the width of a door or passageway, the type C Twin-Section Boiler is recommended, as shown at right. When entry is extremely limited, the field erected type KD Knocked Down Water Tube Boiler prevents cutting and patching of building walls.

induced draft boiler eliminates stack

With the type IDL Induced Draft Boiler at right, modern school architecture is enhanced by the absence of a stack. The induced draft fan guarantees normal operation to 200% of nominal rating. Exhaust gas is vented by a small duct terminating just above building roof. Emergency grates can be installed in base ahead of burner, using coal or wood in event of fuel or power failure. Thus the school is insured against lack of heat.



JACKSON & CHURCH • FURNACE DIVISION

Saginaw, Michigan

Manufacturers of

AMERICA'S LARGEST AND MOST COMPLETE WARM AIR HEATING LINE!

PERIMETER HEATING
with J-C FORCED WARM AIR FURNACES *offers*

. . . individual room controls
. . . constant air circulation

Today's modern school structures require a modern approach to the problem of heating. The J-C 2000 is the newest of an extensive line of furnaces engineered especially to solve these problems.

Typical is a system designed for a school located in the variable climate of a North Central state. During severe winter months, the J-C heating system can provide 10 cfm of filtered fresh outdoor air and 20 cfm of recirculated air—for a total of 30 cfm of filtered air per student.

Under milder weather conditions during spring and early fall, the heating system is engineered to provide as much as 100% filtered, fresh outdoor air, if desired. In addition to these engineering requirements, the heat can be individually room-controlled, with constant air circulation throughout the entire room.

The J-C 2000 is available for either gas or oil firing, with bonnet output of 1,600,000 Btu per hour. Other Jackson & Church floor type furnaces are manufactured with outputs up to 3,800,000 Btu per hour.

Write J-C's Engineering Department for further details on this and other heating systems designed especially for schools.



Jackson & Church model 2000 from the Powerated Series of warm air furnaces.

JOHNSON SERVICE COMPANY

Main Office and Factory—Milwaukee 2, Wisconsin

DIRECT BRANCH OFFICES IN PRINCIPAL CITIES

AUTOMATIC TEMPERATURE AND HUMIDITY CONTROL SYSTEMS • MANUFACTURING • PLANNING • INSTALL

Johnson temperature and humidity control systems are completely automatic, making use of air under pressure to actuate various controlling devices which regulate temperature and humidity. Johnson Individual Room Control or Zone Control is readily adaptable to all types of heating and ventilating systems—radiators, unit ventilators and heat delivery ducts. In any school, small or large, old or new, Johnson Control is equally applicable. Dependable accurate control is assured.



T-400 Single Room Thermostat

SINGLE TEMPERATURE THERMOSTATS—Johnson single temperature room thermostats have a bi-metal sensing element which responds immediately to temperature changes. Furnished either reverse or direct acting for proportional or two-position action, these thermostats are available in a large variety of finishes to harmonize with all color schemes. Open or concealed adjustment available on all thermostats. Also furnished with suitable guards.



T-460 "Dual" Room Thermostat

TWO-TEMPERATURE THERMOSTATS—"*Dual*" Thermostats are equipped with two separate bi-metal sensing elements which allow two completely independent settings. Changing from "occupancy" to "non-occupancy" temperature is accomplished automatically by changing the supply pressure. Available also with manual changeover. Each thermostat may be returned to its original "occupancy" control point if desired, even though the entire system is on "non-occupancy", by merely pushing a button on the cover. Furnished for proportional action only, direct or reverse acting with various adjusting features. Finishes available to fit any color scheme.



T-333 Airstream Thermostat

REMOTE BULB THERMOSTATS—Thermostats with liquid-filled capillary elements are designed to control the discharge air temperature in unit ventilators or blast heating coils. All instruments have sensing elements directly in the discharge airstream to assure quick, accurate response. These instruments may be used where it is not practical to have the sensing element housed within the instrument cover.

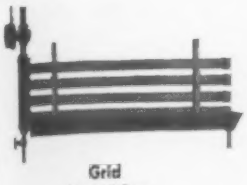


T-900 Master Thermostat

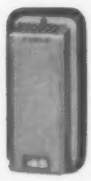
"MASTER-SUBMASTER" CONTROL—The Johnson "Master-Submaster" method of control utilizes the principle of a Master thermostat resetting the control point of a Submaster thermostat in accordance with the temperature at the Master thermostat. Using a high sensitivity thermostat as the Master, very accurate, stable control is produced with the Submaster controlling at a point determined by the Master. This method assures minimum deviation in temperature even though wide variations in steam pressure may occur. It also eliminates hunting.



T-901 Submaster Thermostat



Grid Humidifier



H-103 Room Humidostat

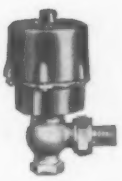
HUMIDOSTATS AND HUMIDIFIERS—Room humidostats are actuated by hygroscopic elements which are affected by the relative humidity of the air to which they are exposed. The elements most commonly used for school installations are made of horn or balsa wood. These humidostats are used in conjunction with humidifiers to keep the relative humidity at a constant value. Humidifiers are available in grid or pan types.



V-107 3-Way Mixing Valve



V-103 Coil Valve



V-153 Sylphon Convector Valve

VALVES—Johnson Valves which are controlled by thermostats or humidostats are available in a variety of styles and sizes to fit all applications. All Johnson Valves, from large coil valves down to the small convector valves, are noted for their rugged construction, long life and accurate operation. Available with rubber diaphragm or "Sylphon" bellows operators, which assure positive seating, these valves are designed to give dependable trouble-free control. Valves with flat discs or modulating plugs are available. There is a wide range of finishes for exposed radiator valves.



D-251 Piston Damper Operator



D-104 "Sylphon" Damper Operator

DAMPER OPERATORS—Johnson Damper Operators are available in two standard models, the "Sylphon" and Piston type. The seamless "Sylphon" bellows operators are used to operate dampers in unit ventilators where short strokes are required and are available in four sizes. Piston type damper operators are used on large dampers and provide full power and long stroke for proper positioning. Also available in four sizes.



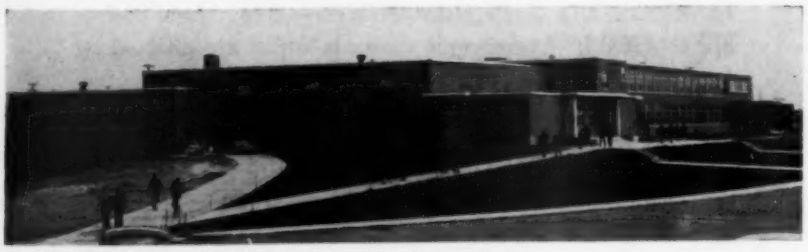
D-201 Mixing Damper

DAMPERS—Dampers find a variety of uses in heating and ventilating systems, such as admitting the required quantities of tempered and warm air to a heating duct, controlling the amount of outdoor air received, regulating the air leaving a unit ventilator and controlling roof ventilators. They are designed for quiet operation at all times, whether large or small.

JOHNSTON BROTHERS, INC.

Ferrysburg, Michigan

ESTABLISHED 1864

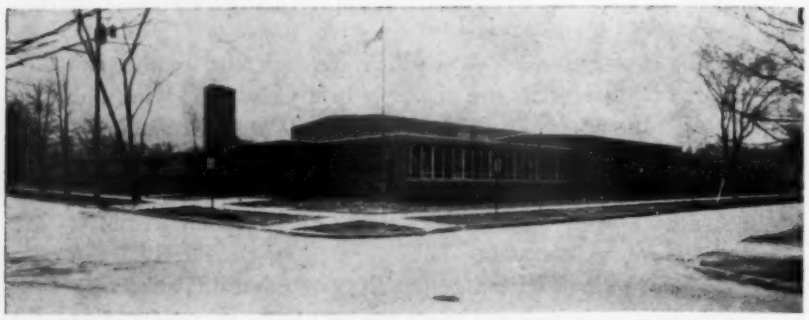


Senior High School—3 Johnston Automatic Steam Boilers

MODERN BOILERS FOR MODERN SCHOOLS.
SELF-CONTAINED.
FULLY AUTOMATIC.
GUARANTEED PERFORMANCE.

A.S.M.E. Code construction. Underwriters Laboratories and Factory Mutual approved.

OIL or GAS FIRED. Completely equipped and performance tested before shipment.



Elementary School and Auditorium—One Johnston 75 Horsepower Boiler

Our factory-trained Service Engineer, located in each sales territory, is capable and ready at all times to assist in maintaining uninterrupted operation and capacity continually.

Not only for new buildings but equally adapted to modernizing existing buildings.

High or Low Pressure; complete range of capacities.

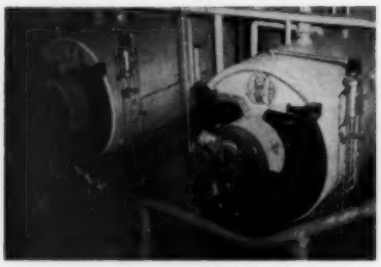
EFFICIENT—TROUBLE-FREE;
UNUSUALLY QUIET AND DEPENDABLE.

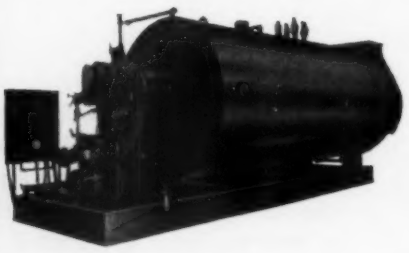
Send for BULLETIN 512.

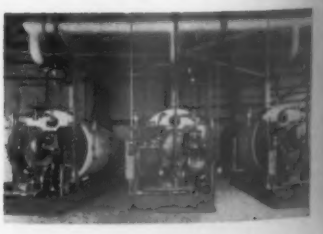


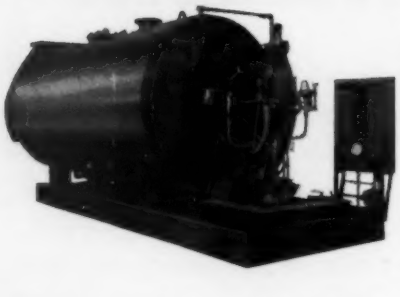
Junior High School—One 100 Horsepower Johnston Automatic Boiler



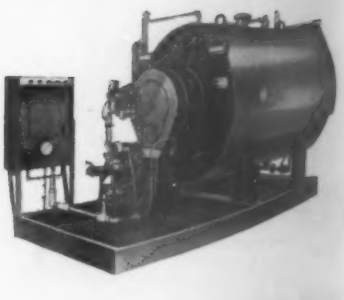








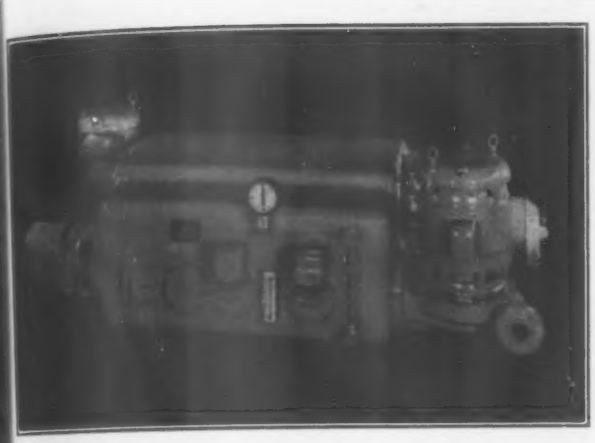
WE ALSO BUILD STANDARD SCOTCH BOILERS AND COMPACT FIREBOX BOILERS, FOR STOKER, OIL OR GAS FIRING. Send for Catalogues, 4000, 9000, 702 or 1500.



THE NASH ENGINEERING COMPANY

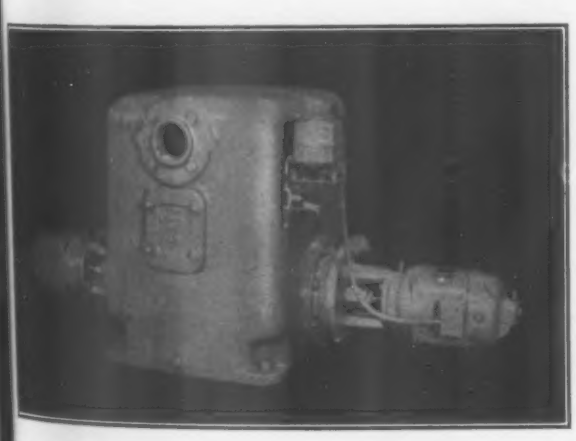
222 Wilson Road, South Norwalk, Conn., U.S.A.

SALES AND SERVICE OFFICES IN ALL PRINCIPAL CITIES



RETURN LINE VACUUM HEATING PUMP UNIT TYPE

Removes air and condensation from return lines of vacuum heating systems. Separation of liquid and gas is made under vacuum. Independent air and water units, combined in single casing and rotating on single shaft, handle returns with high efficiency. Air unit delivers to atmosphere without back pressure. Water unit delivers directly to boiler. Bronze fitted throughout. No internal wearing parts. No internal lubrication. Supplied direct connected to electric motor, or for belt drive, for continuous operation or with automatic control. Standard capacities up to 40,000 sq ft equivalent direct radiation. Larger units special. *Bulletin on request.*



NASH HOSPITAL PUMPS

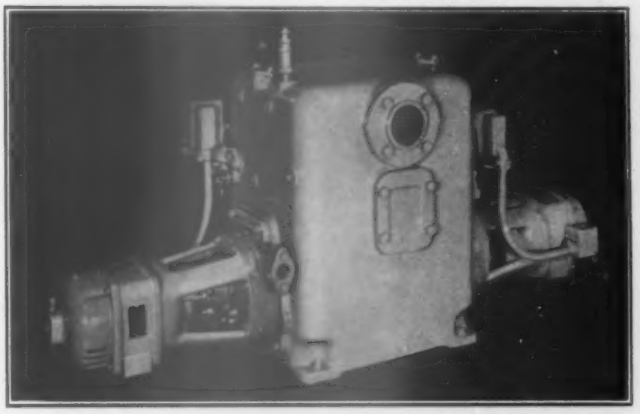
For vacuum and pressure systems in hospitals to provide vacuum or pressure to operating rooms, laboratories and wards. Nash pumps possess particular characteristics adapting them to this exacting service. Silent service is assured, because the pumps and equipment are installed in a mechanical equipment room. Automatic control assures constant maintenance of the correct vacuum or pressure. No pulsation is present in either vacuum or pressure produced by Nash Pumps. Air delivered by Nash Compressors is entirely free from dust, heat or oil. Even dust entering the pump inlet is effectively removed. No oil or dust filters are required. No expert attendance is required. *Bulletin on request.*

RETURN LINE VACUUM HEATING PUMP TYPE CSM

The new CSM Heating Pump achieves a high level of performance and efficiency. Complete flexibility is secured in this design, since each pumping element is driven by its own motor, actuated by its own control.

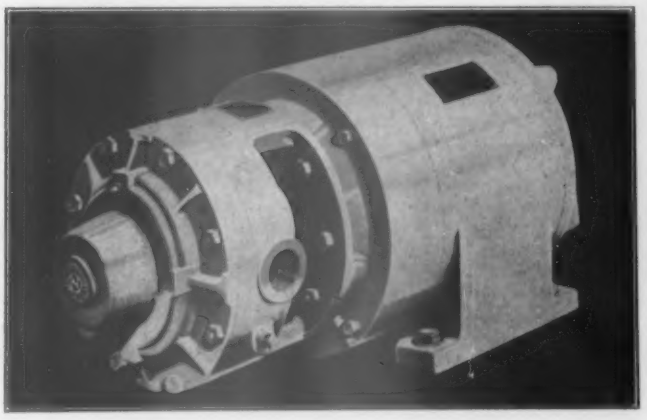
This makes possible a wide range of air and water capacities that can be selected to meet the exact requirements of each particular job.

These pumps are now available in a full range of air and water capacity combinations, for operation up to 20 inches Hg vacuum, and for pressures from 10 lbs to 70 lbs. *Bulletin on request.*



CONDENSATION PUMP

Removes the condensation from radiators in return line steam heating systems, particularly radiators set below the boiler water line level, and pumps the condensation back to the boiler. Pump is bronze fitted with enclosed centrifugal impeller of improved design. By making the pump casing a part of the return tank, and bolting the motor base to the tank, floor space is conserved. The rectangular construction permits installation in a corner against the wall. Supplied in standard sizes with capacities ranging from 1½ to 225 gpm of water. For serving up to 150,000 sq ft of equivalent direct radiation. *Bulletin on request.*



PETRO

3116 West 106th Street, Cleveland 11, Ohio

Quality Heating and Power Equipment since 1903

PETRO
REG U S PAT OFF

INDUSTRIAL AND COMMERCIAL OIL BURNING SYSTEMS FOR AUTOMATIC, SEMI-AUTOMATIC OR MANUAL OPERATION

FOR UNHEATED COMMERCIAL OILS:

Model W-A: Automatic ignition with synchronized control of oil and air.

Model W-SA: Automatic variation of firing rate with manual ignition, or manual variation with manual ignition.

FOR HEATED OILS: HEAVY NO. 5 (Models W-A-E and W-SA-E); BUNKER "C" NO. 6 (Models W-AH and W-SAH)

Models W-A-E; W-AH: Automatic ignition with synchronized control of oil and air, and automatic control of oil heaters.

Models W-SA-E; W-SAH: Automatic variation of firing rate with manual ignition. Or manual control of oil and air with manual ignition. Manual control of heaters.

PETRO MODEL W ROTARY-CUP OIL BURNERS:

A Petro Model W consists of a self-contained assembly of fan, pump, rotary cup atomizer and all oil and air adjustment apparatus. It is either direct-driven by means of a built-in motor, or belt-driven from motor mounted on burner housing. Interlocking oil and air control mechanism permits operation at any point within the burner's minimum and maximum range.

MODEL W-A-E FOR HEAVY NO. 5 OIL REQUIRING ONLY MODERATE PREHEATING:

Petro Model W-A-E meets today's growing need for a burner to handle the more viscous No. 5 oil that is becoming increasingly available. Such oil has a viscosity from 300 seconds Saybolt Universal at 100°F to 40 seconds Saybolt Furol at 122°F.

A Petro Model W-A-E is equipped with a thermostatically-controlled electric heater. In all other respects it resembles the popular economical Petro Model W-A for burning cold No. 5 oil. It is supplied in all Model W-A sizes except W-8½, W-9 and W-10.

THERMAL VISCOSITY CONTROL:

Dependable and accurate control of oil viscosity — and hence of oil flow and combustion efficiency — is provided through automatic control of oil temperature. This basic principle underlies the Petro Thermal Viscosity Control System.

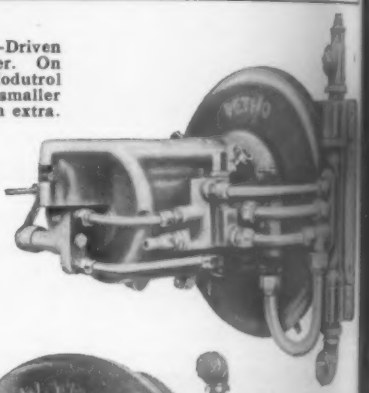
MODULATED FIRE CONTROL:

Standard equipment on Model W-5 and larger burners, and supplied as an extra on smaller sizes when so ordered, the Petro Modulating Control provides accurate and completely automatic control of firing operation.

CAPACITIES OF PETRO MODEL W OIL BURNERS AT 70% BOILER EFFICIENCY

Burner Size	Motor Horsepower	Maximum Gals. per Hour	Rated Capacity Boiler Horsepower	Steam Radiation, Sq. Ft., E.D.R.
W-2½	½	11	34.4	4810
W-3	½	15	47.0	6560
W-4	¾	25	78.5	10940
W-5	1	35	110.0	15300
W-6	2	50	157.0	21880
W-7	2	70	220.0	30600
W-8	3	100	313.6	43750
W-8½	3	120	376.0	52500
W-9	3	145	454.7	63250
W-10	5	200	625.0	87000

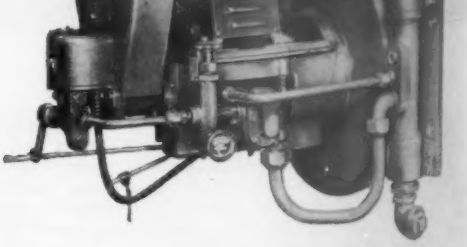
NOTE: Model GW Combination Gas and Oil Burners are available in sizes from 3,750,000 Btu per hour heat release to 15,000,000 Btu per hour. The oil side consists of the Model W Rotary-Cup Burner mounted on a refractory lined air register which also contains the Gas Burner. A premix blower supplies gas and primary air to this burner to give short clean fires. Change over from one fuel to the other may be accomplished in a few seconds, automatically if desired.



* Model WD-AH Direct-Driven Rotary-Cup Type Burner. On W-5 and larger sizes, Modutrol Firing is standard. On smaller sizes, it is supplied as an extra.



* Model W-A-E Direct-Driven Rotary-Cup Type Burner. On W-5, W-6, W-7 and W-8 Modutrol Firing is standard. On smaller sizes, it is supplied as an extra.



* Model WO-A Belt-Driven Rotary-Cup Type Burner. On W-5 and larger sizes, Modutrol Firing is standard. On smaller sizes, it is supplied as an extra.

* All Petro Model W burners are available in either direct- or belt-driven motor types.

PETRO

3116 West 106th Street, Cleveland 11, Ohio

Quality Heating and Power Equipment since 1903

PETRO

REG. U.S. PAT. OFF.

INDUSTRIAL AND COMMERCIAL OIL AND GAS BURNING SYSTEMS FOR EVERY NEED

LARGE CAPACITY OIL BURNERS, MODELS P-60, P-90, P-200, P-300

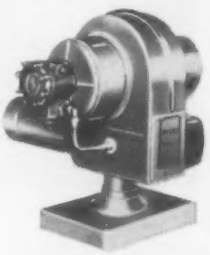
Model P-200, standard control



Model P-90, standard control

Electronic controls available for all Petro burners

In addition to domestic heating in large residences, these Petro burners have a wide field of application in many commercial and public buildings such as schools, churches, stores, garages, and apartments.



Petro Large Capacity Oil Burners produce a high combustion efficiency over a wide range of capacities.

This exceptionally high operating efficiency is the result of very accurate control of the air fuel ratio and extremely effective mixing of the oil and air in the combustion chamber.

Complete electrode and nozzle pipe assembly is removable through a large access opening at the rear of the burner. All electrical connections and wiring are concealed. Simple and easy to adjust or service.

A sturdy one-piece rigid frame holds all parts in perfect alignment, assuring years of quiet, safe, economical and trouble-free performance. Compact design—symmetrical and attractive in appearance—occupies minimum floor space.

"Single or Multiple Port" air regulation is designed to prevent clogging of air openings with dirt or lint.

The entire unit is constructed of the highest quality materials available.

CAPACITY OF PETRO PRESSURE ATOMIZING BURNERS

Burner Model	Nozzle Size Gals. per Hr.	Total Capacity* Steam Sq. Ft.	Total Capacity* Hot Water Sq. Ft.**	Approximate Shipping Weight
[illegible]	3 to 6	1050 to 2100	1680 to 3360	80
[illegible]	5 to 9	1750 to 3150	2800 to 5050	130
[illegible]***	9 to 20	3150 to 7000	5040 to 11200	180
[illegible]	20 to 30	7000 to 10500	1200 to 16800	205

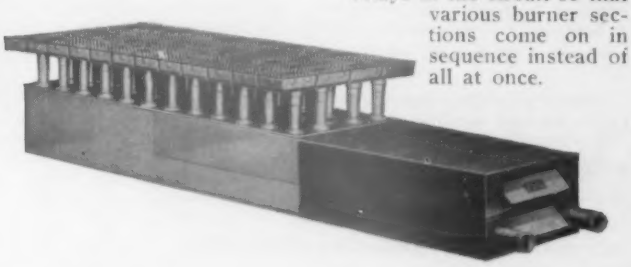
* Total capacity equals standing radiation, plus piping loss, plus pick-up for hot water.

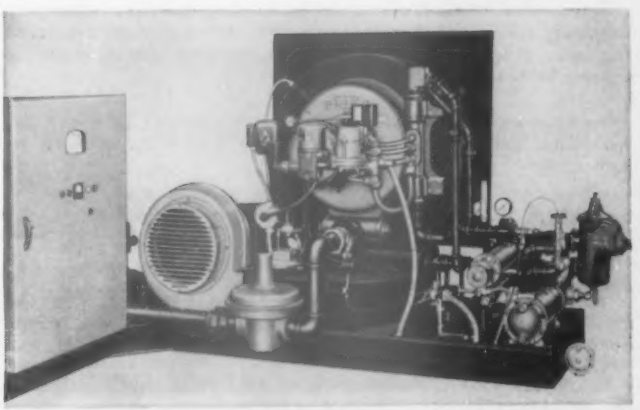
** Rating based upon water at 170° F. in radiators.

*** Electronic controls standard on P-300E, optional on other burner models.

PGV SERIES COMMERCIAL—INDUSTRIAL GAS BURNERS

Available in a wide range of stock sizes and capacities providing from 450,000 BTU input up to 11,520,000 BTU. Burner comes complete in one assembly, made up of manifold, piping, draft box, and draft doors. Easily installed through door or ash pit opening. Burner is step-acting and modulating by relays in the circuit so that various burner sections come on in sequence instead of all at once.





PETRO COMPLETE "PACKAGED UNIT" Consisting of Burner (for oil or gas or both), Fuel System, Control Panel, and Preformed Refractory Combustion Throat.

This Petro package unit is much more than a conversion burner. It's a complete combustion system in which all elements are correctly balanced and integrated—a thoroughly engineered firing plant. Includes burner (for oil or gas or both), fuel system, forced draft air supply, control panel, and pre-formed refractory combustion throat. Installation requires little more than bolting the entire unit to the boiler-front and making service connections for power and fuel. This represents a substantial saving in installation time and cost—but even more important it means a factory tested and assembled unit for high operating efficiency and fuel savings.

Control panel is totally enclosed with all instruments wired and tested at factory.

The units are designed for easy application to all types of boilers including the Scotch Marine. They operate either under normal firebox draft conditions or under positive pressure in sealed firebox boilers which are designed for operation under furnace pressure.

ORR & SEMBOWER, INC.

Morgantown Road, Reading, Pa.

Builders of Dependable Boilers Since 1885

Powermaster® PACKAGED AUTOMATIC BOILERS

Dependable, Low-Cost Steam Generation or Hot Water Supply with Light Oil, Heavy Oil, Gas, or Combination Gas/Oil Firing

Powermaster boilers are modern, compact, factory-assembled, automatic units with an outstanding record for highly dependable and efficient performance. Two models are available in standard sizes of 15 to 500 hp. for steam generation to 250 psi. and for hot water to 30 psi. Both models are designed for firing various fuel oils—natural or manufactured gas—or combination gas and oil. This cost-saving advantage is available in such a wide range of capacities only with ***Powermaster*** Packaged Automatic Boilers.

Powermasters are designed and built to ASME Boiler Code requirements, approved by Underwriters' Laboratories, Inc., and fully guaranteed by Orr & Sembower, Inc. All units are thoroughly factory-tested under fire and supplied with a complete test report.

Single and multiple installations of ***Powermaster*** Packaged Automatic Boilers are now supplying steam and hot water with outstanding reliability and economy in elementary and high schools, trade and private schools, colleges and universities all over the United States.

Maintenance-Saving Accessibility—Water and fire sides are completely accessible for easy cleaning and inspection without disturbing burner or accessories.

Three-Pass Boiler—Successive parallel passes maintain most efficient flue gas velocity, provide maximum maintenance convenience, and eliminate complex front end baffling. All ***Powermasters*** have 5 sq. ft. of heating surface per boiler hp.

Controlled Water Circulation—Freedom from ineffectual boiler water eddies assures fast steaming, high quality dry steam, and quick response to load changes. Scrubbing action of rising water prevents corrosive gas deposits on tube surfaces.

Forced Draft—provides more accurate control of combustion air supply; permits use of smaller lower-cost fan and motor; requires less fan maintenance—no hot products of combustion pass through fan.

Powermaster design, construction, and operating features are fully described in illustrated bulletin available on request.

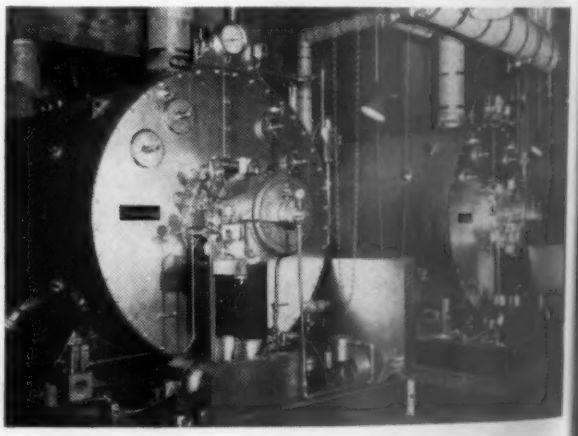
PRINCIPAL FEATURES

Low-Cost, Compact Installation—*Powermaster* boilers are delivered completely assembled and fully equipped including all necessary fittings for completing fuel, water, electric, steam and vent connections. No special foundation or costly stack is needed. Much less space is required than for ordinary boiler of equal capacity.

Fuel Economy—Perfect coordination between O&S-built boiler and O&S-built burner results in high operating efficiency at all loads that keeps fuel costs down.

Clean, Quiet Operation—Complete, efficient combustion at all loads assures smokeless operation. Piped-in fuels and leak-tight construction aids boiler room cleanliness.

Automatic Operation—Up-to-date automatic operating and safety controls provide maximum dependability and protection with least possible attention from operator.



250 hp. oil-fired *Powermasters* (Model 3) supplying steam and hot water in a high school.

Powermaster RATINGS AND DIMENSIONS

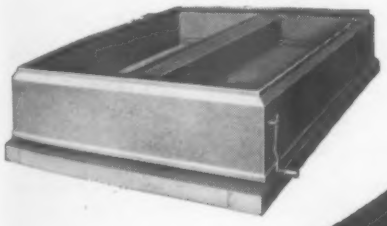
BOILER H. P.	OUTPUT			OVERALL DIMENSIONS				WEIGHT Lb.	Fuel Consump.(100% of rating)		
	Lbs.Steam/ Hr. at 212F.	EDR (Water) Sq. Ft.	EDR (Steam) Sq. Ft.	Length	Width Oil	Width Gas	Height		#2 Oil Gal./Hr.	#6 Oil Gal./Hr.	Gas Cu.Ft./Hr.
15	517	3,336	2,085	7′ 0″	3′ 7″	4′ 0″	5′ 4″	2,700	4.7	—	628
20	690	4,448	2,780	7′ 11″	3′ 7″	4′ 0″	5′ 4″	3,000	6.2	—	837
30	1,035	6,672	4,170	8′ 9″	4′ 1″	4′ 6″	6′ 2″	3,750	9.4	—	1,255
40	1,380	8,896	5,560	10′ 3″	4′ 9″	5′ 3″	6′ 9″	6,350	12.5	10.8	1,673
50	1,725	11,120	6,950	11′ 8″	4′ 9″	5′ 3″	6′ 9″	6,750	15.6	13.5	2,091
60	2,070	13,344	8,340	10′ 6″	5′ 9″	6′ 3″	7′ 4″	7,900	18.7	16.1	2,510
70	2,415	15,568	9,730	11′ 6″	5′ 9″	6′ 3″	7′ 4″	8,500	21.9	18.8	2,928
80	2,760	17,792	11,120	11′ 9″	6′ 2″	6′ 10″	8′ 1″	10,700	25.0	21.5	3,346
100	3,450	22,240	13,900	11′ 3″	6′ 7″	7′ 3″	8′ 8″	12,500	31.2	26.9	4,183
125	4,312	27,800	17,375	13′ 1″	6′ 7″	7′ 3″	8′ 8″	14,000	39.1	33.6	5,229
150	5,175	33,360	20,850	14′ 7″	7′ 11″	8′ 9″	9′ 5″	17,350	46.9	40.4	6,274
200	6,900	44,480	27,800	16′ 7″	7′ 11″	8′ 9″	9′ 6″	22,100	62.5	53.8	8,366
250	8,625	55,600	34,750	15′ 7″	8′ 1″	8′ 11″	9′ 11″	25,560	78.1	67.3	10,457
300	10,350	66,720	41,700	17′ 5″	8′ 1″	8′ 10″	9′ 11″	33,700	93.8	80.7	12,548
350	12,075	77,840	48,650	17′ 9″	9′ 0″	9′ 10″	10′ 11″	36,000	109.4	94.2	14,639
400	13,800	88,960	55,600	18′ 11″	9′ 1″	9′ 10″	10′ 11″	37,000	125.0	107.7	16,731
500	17,250	111,200	69,500	19′ 7″	9′ 1″	10′ 0″	11′ 8″	45,000	156.3	134.6	20,914

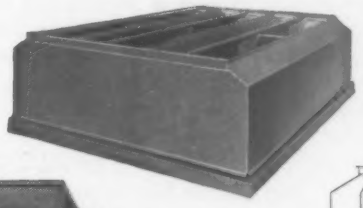
THE SWARTWOUT COMPANY

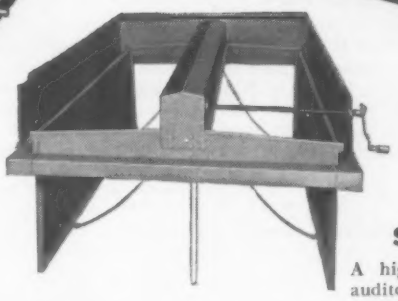
18527 Euclid Avenue Cleveland 12, Ohio, U. S. A.

Representatives In All Principal Cities

Two Swartwout Products for SAFETY STAGE VENTILATION

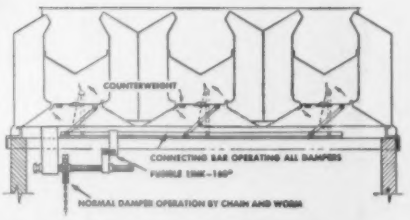






Swartwout FIRE VALVE

A roof unit designed specifically for releasing heat, smoke and fumes in the event of fire. Each unit provides 46 sq. ft. of free area opening when two large dampers drop, released by Underwriters-approved 160° fusible link. Dampers can also be opened and closed by a chain when desirable to use the unit for extra ventilation in dry weather. The unit is weatherproof when closed. The Fire Valve is only 21" high and mounts on a roof curb 6'5" x 10'5". Damper hinges contain no parts that will corrode or freeze in any way.



Swartwout AIRMOVER Automatic Opening

A highly efficient roof ventilator particularly suitable for schools, auditoriums, gymnasiums, etc. Because of its low height—32"—air travel is short, and air friction is reduced to a minimum. Weatherproof at all times; ample drainage provided. Efficient dampers, operated in unison, can be adjusted to any opening desired.

For normal ventilation purposes, manual or mechanical operation of dampers can be arranged. As a fire hazard safety device, release of damper operating bar by the melting of an approved 160° fusible link permits weighted dampers to open wide when fire occurs. Heat and smoke pass rapidly through the Airmover, which meets the requirements of the National Board of Fire Underwriters.

The efficient, silent AIRLIFT for duct exhaust





Utilizing low fan tip speeds and backwardly curved blades in a highly efficient centrifugal type fan, Airlift achieves the desired low-noise-level operation for duct exhaust on public buildings. A number of important design and structural features are fully covered in our bulletin on the Airlift. Most important are the close coupling of fan and throat, and oversize exhaust area which permits a lower curb. The entire assembly insures positive exhaust with a minimum of friction and turbulence, and unusually quiet operation. Airlift's higher efficiency often permits use of smaller size units than ordinarily specified in other centrifugal ventilators. Airlift is made in 14 sizes with 49 capacity variations. Airlift Jr. serves to exhaust from smaller areas—is made in 2 sizes with 4 capacity variations. Write for full description of the Airlift and Airlift Jr.

HEAT VALVE — ridge and flat roof gravity ventilator or outlet over duct system

For peak roofs or sawtooth construction, the Swartwout-Dexter Heat Valve has no equal as a continuous, weatherproof vent. It has been proved on thousands of feet of industrial, commercial and military roofs. Heat Valve is frequently used on school buildings in even shorter sections than the example shown at right, on flat roofs over outlets of duct systems exhausting corridors and other spaces. This is the original "Heat Valve" type ventilator, improved over the basic Dexter design. Air-travel is short—almost frictionless. Heat Valve's low overall height is important architecturally, also. Exterior shape guides outside air currents to create additional capacity through suction effect. Efficient damper easily operated for any position from tight closed to full open. Write for descriptive bulletin on the Heat Valve.



TITUSVILLE IRON WORKS

Division of Struthers Wells Corporation

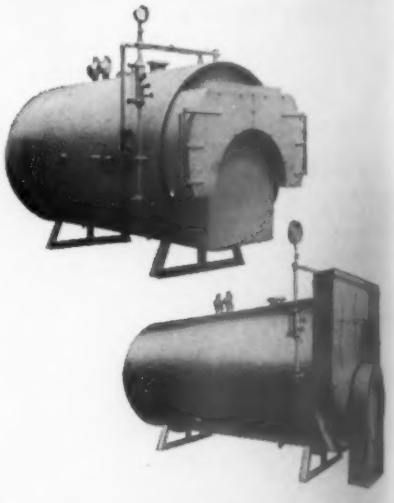
Titusville, Pennsylvania

Manufacturers of Dependable Boilers Since 1860



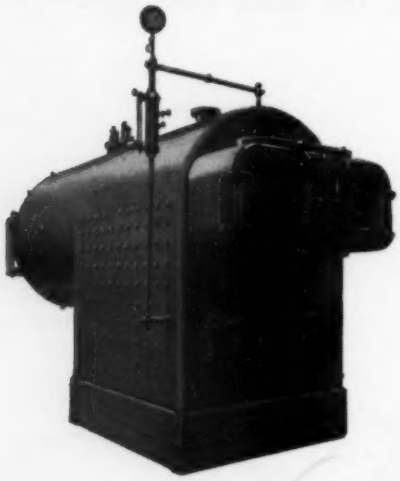
TITUSVILLE COMPACT STEEL HEATING BOILERS

This all-steel heating boiler is compact in design, requiring less boiler room floor space than any other type, and is ideal for school heating. Excellent operating economies are obtainable, due to the unit's modern 3-pass construction feature. Titusville Compact Boilers are built for use with all fuels and all types of firing—ample combustion space is provided to economically burn oil, gas, or coal. These boilers are manufactured in 19 different sizes, all rated in accordance with latest rating code of The Steel Boiler Institute. They are constructed using ASME code rules. Each boiler is factory inspected and tested by Hartford. Bulletin No. B-3000-B.



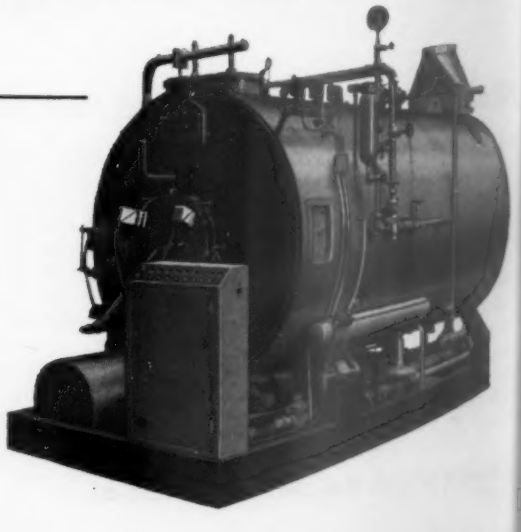
TITUSVILLE SCOTCH MARINE BOILERS

The famous Titusville Scotch Marine Boilers are a specialty of this company. As the largest builder of Scotch Marine Boilers, Titusville has developed this type to be the last word in economy and durability for both power and heating purposes. The Type SPO (Bulletin B-3075-A) and Wee Scot (Bulletin B-3050-A) are of all-welded construction, with large combustion chambers assuring unusual quick steaming and high efficiency, and strong cylindrical design assuring long life and ease of cleaning. Both provide a volume of 1½ cu. ft. per 10 sq. ft. of heating surface. The Type SOH Wet Back Top Heating Boiler (Bulletin 5135-C) features low water line and low head room, and is available in 19 sizes. Outstanding advantages include extra large steam volume and disengaging area. Like the Type SPO boilers the Type SOH require no pit or brick base for installation.



TITUSVILLE ALL-WELDED FIREBOX BOILERS

The Titusville WP Type Firebox Boilers are all-welded, utilizing advanced welding methods, quality steels and modern fabricating techniques. A streamlined boiler of exceptional strength, the Type WP has no riveted seams or screwed stays, and remains tight under all operating conditions. A self-cleaning crown sheet and ample clean-out facilities are included in the design. These boilers combine high efficiency and low maintenance in service, and are readily adaptable for burning all sizes of bituminous and anthracite coal, or, in the WPO Model, for using any recognized oil, gas or combination gas-oil burners. Bulletin No. B-3030.

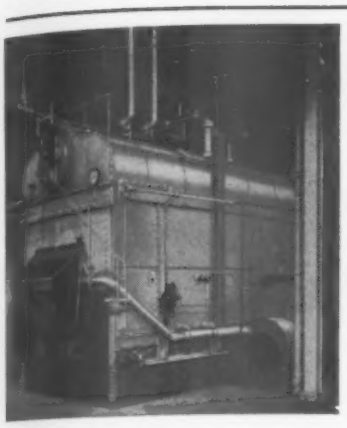


TITUSVILLE TICOSTEAM GENERATOR

A Package Steam Generator

This Titusville Package Steam Power Plant is founded upon the experience of 90 years of Titusville boiler manufacture. Before producing the Ticosteam Generator, many installations of existing steam generators were thoroughly evaluated to be sure of achieving a definitely superior Titusville product. The Ticosteam Generator is furnished complete and ready to operate when connected to the necessary facilities. It is factory finished, factory tested, factory certified, and is equipped with safety features that are outstanding in the field. These units are available in various sizes, from 690 to 12,075 lbs. of steam per hour and are designed for operation on light oil and combination light oil and gas—heavy oil and combination heavy oil and gas—and straight gas. Conservative ratings assure a thermal efficiency of 80% when fired with oil or gas. Bulletin B-3100.

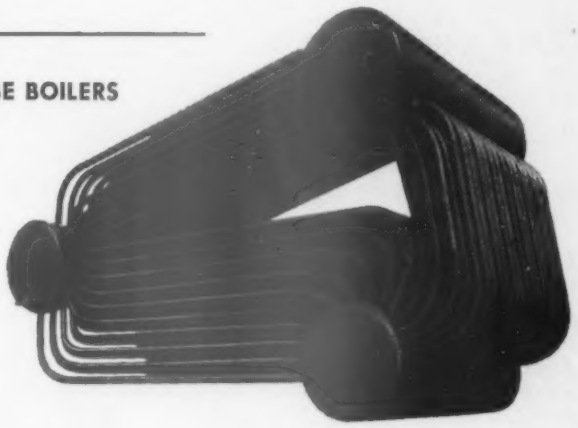
TITUSVILLE IRON WORKS



TITUSVILLE TICOTHERM STEAM GENERATORS

These large, highly efficient water tube steam generators are economical in operation and compact in design. They are constructed to meet or exceed a safety factor of 5, and drums are fusion welded, X-ray tested and stress relieved to meet or exceed ASME requirements as well as all local and state codes. Excellent results are achieved with any type of fuel. Ticotherm Steam Generators are completely insulated—top, sides and rear—with a minimum of 7 inches of refractory and insulation at side walls; boilers are completely steel encased. Four passes of gas travel are provided by vertical baffling, resulting in a minimum of draft loss and maximum heat absorption. Soot blowers are furnished as standard equipment on all boilers except gas-fired models. Bulletin B-3250-A.

TITUSVILLE 3-DRUM WATER TUBE BOILERS



Titusville Type TDL Welded Low Head Water Tube Boilers are built in many standard sizes to meet specific school heat and power requirements. These boilers are the "work horses" of the boiler industry. Outstanding features include larger all-welded drums permitting a higher ratio of water in the boiler to horsepower output; all boilers X-ray tested and stress relieved to meet or exceed ASME, state and local codes; an absolute safety factor of 5 or more; low head design, saving head room; efficient operation on any type of fuel. Bulletin B-3200-A.

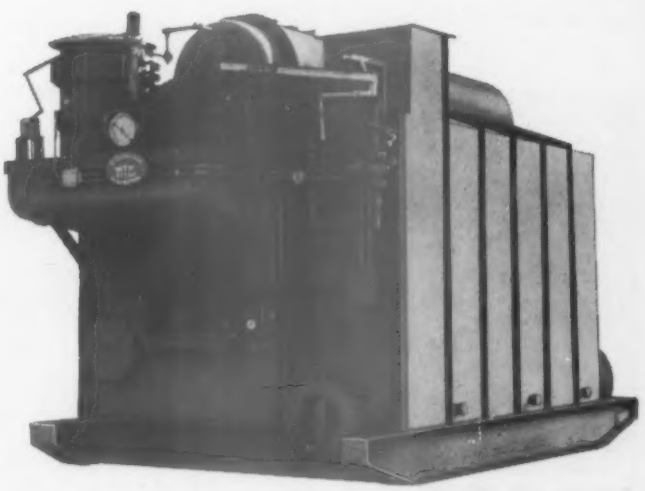


TITUSVILLE 4-DRUM WATER TUBE BOILERS

Titusville Type W Welded 4-Drum Water Tube Boilers may be fired with coal, oil or gas fuels and provide outstanding continuous daily performance of high efficiency—due to proper proportioning of drum and tube areas, natural circulation and scientific baffling. These boilers will produce dry steam at a minimum of cost and with a maximum span of life. Records maintained over many years demonstrate a consistently low average steam cost with these Type W Boilers, proving high efficiency that is unimpaired by time and varying load conditions. Many items of standard equipment are included, with special equipment available to meet any specific school installation requirement. Bulletin 3225-A.

TITUSVILLE WTP PACKAGE WATER TUBE BOILER

This compact, shop-assembled water-tube steam generator features simplicity and economy of operation, and is shipped as a package complete with firing equipment, controls and all other components installed ready for service connections in the field. Enclosed and protected by all-welded, pressure-tight steel casing, the unit is easy to move by lifting or skidding, and erection costs are reduced to a very low minimum. Forced draft, pressurized furnace operation eliminates need for stack or induced draft fan. The Titusville WTP Steam Generator is designed to use heavy oil; heavy oil and gas combination; light oil; light oil and gas combination; natural gas; manufactured gas; coke oven gas. Construction is in accordance with latest code requirements. Fully automatic welding is employed, welds are X-rayed, and drums stress-relieved. All operations are inspected by resident Hartford steam boiler inspector. Bulletin WTP.



Write for the respective descriptive bulletins on the boilers in which you are interested — and let us arrange to have our nearest representative call at your convenience to consult on your school heating or power boiler requirements — without obligation of any kind.

THE TRANE COMPANY

La Crosse, Wisconsin

Solve all your school heating–ventilating problems with Trane

"One source"–saves time, simplifies maintenance, pinpoints responsibility

Your "school of the future" will present a multitude of heating-ventilating problems . . . and their solutions will influence the health, comfort and efficiency of students and teachers alike.

These heating-ventilating problems can be solved without the costliness of specially built equipment. From the complete Trane line, you can select *standard* TRANE products, such as the Kinetic Barrier Unit Ventilator System for the classroom, or a heating or ventilating unit for any specific place in the school, because each unit is specifically engineered and sized to handle each job perfectly. All TRANE products are designed and matched *for use together!*

Buying from one reliable source saves time . . . simplifies installation and maintenance. Makes it easy to pin down responsibility.

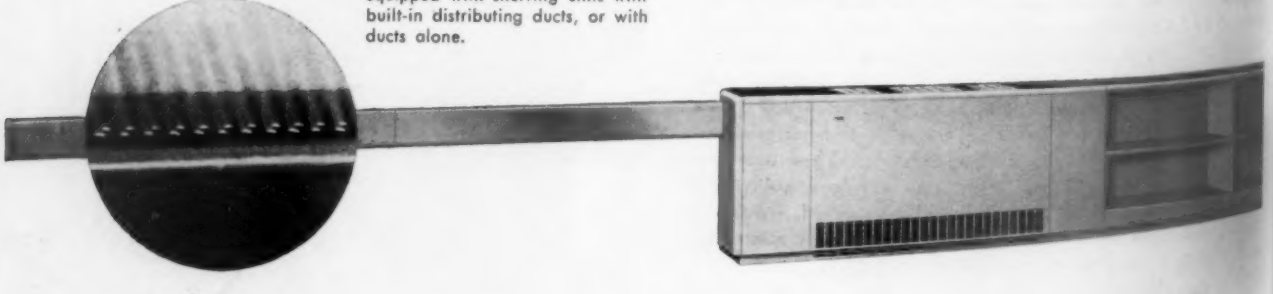
For complete information on any or all TRANE heating or ventilating products for the school, contact your nearby TRANE Sales Office, or write TRANE, La Crosse, Wis.

IN CLASSROOMS TRANE KB *Unit Ventilators* with revolutionary *new kinetic barrier* action stops drafts before they start by blanketing wall of glass with a *forced upward flow* of tempered air. Warm ventilating air is distributed *evenly* throughout the entire classroom, eliminating cold corners and stale air spots all day long.



SMOKE TEST SHOWS how TRANE Unit Ventilator with *kinetic barrier* action forces air upward under pressure, stops chilling downdrafts before they start. Rising not at just one point, but blanketing entire wall, this tempered air blends with room air to keep every part of the classroom fresh and comfortable.

Unretouched smoke picture shows how air is delivered under pressure. Each end of the unit may be equipped with shelving units with built-in distributing ducts, or with ducts alone.



TRANE MANUFACTURING ENGINEERS OF AIR CONDITIONING, HEATING, VENTILATING AND HEAT TRANSFER EQUIPMENT
The Trane Company, La Crosse, Wis. • Eastern Mfg. Div., Scranton, Penn. • Trane Co. of Canada, Ltd., Toronto

THE TRANE COMPANY



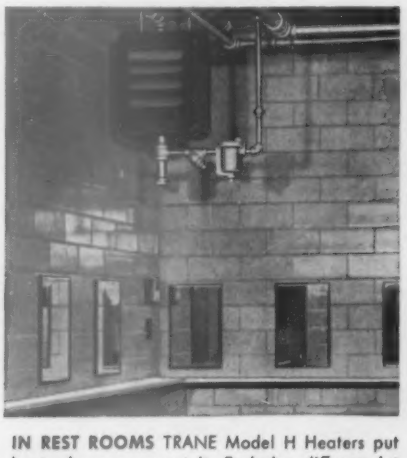
A TYPICAL INSTALLATION of the TRANE KB Unit Ventilator System shows full outside wall coverage. No other unit ventilator ever built can blanket the entire outside wall with a forced upward flow of tempered air, providing better heat and air distribution . . . and protecting pupils from cold downdrafts, even when the heat is off. There is constant downdraft protection whether the unit is heating, ventilating or cooling.



IN HALLWAYS TRANE Wall Line Convectors bring draft-free heating to long wall and window runs, blend with modern buildings.



IN GYMNASIUMS TRANE Projection Heaters, tucked away high above occupied zones, force heat trapped by the ceiling down to floor.



IN REST ROOMS TRANE Model H Heaters put heat where you want it. Exclusive diffusers let you control spread.



IN SWIMMING POOLS TRANE Wall-Fin surrounds area with warmth, prevents drafts. (Trane Torridors add tempered ventilation.)



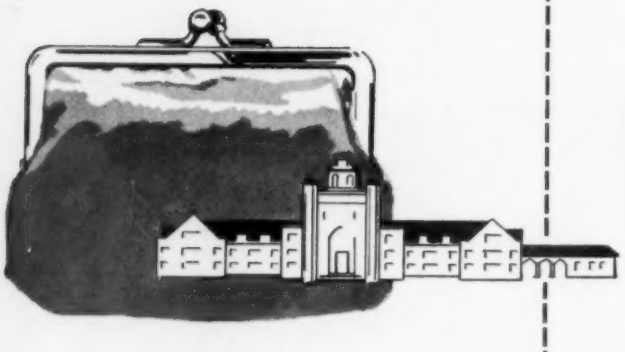
IN ENTRYWAYS TRANE Force-Flo Heaters greet students with warm welcome . . . blanket doors with heat to block cold air, stop drafts.



IN STAIRWAYS . . . and throughout the school, TRANE Convectors combine modern beauty and efficiency.

THE WILL-BURT COMPANY

P. O. Box 908, Orrville, Ohio



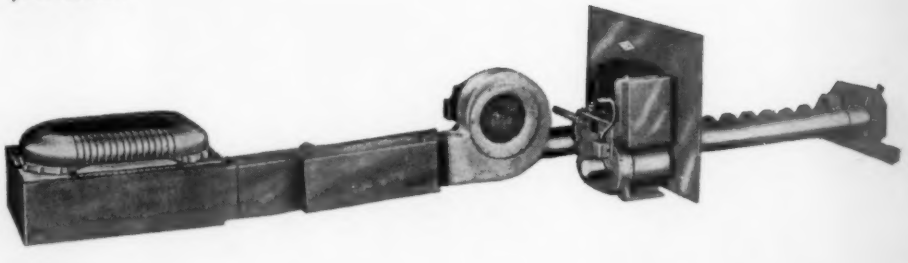
—with a Will-Burt Air Controlled Stoker,

COAL HEAT is BUDGET HEAT

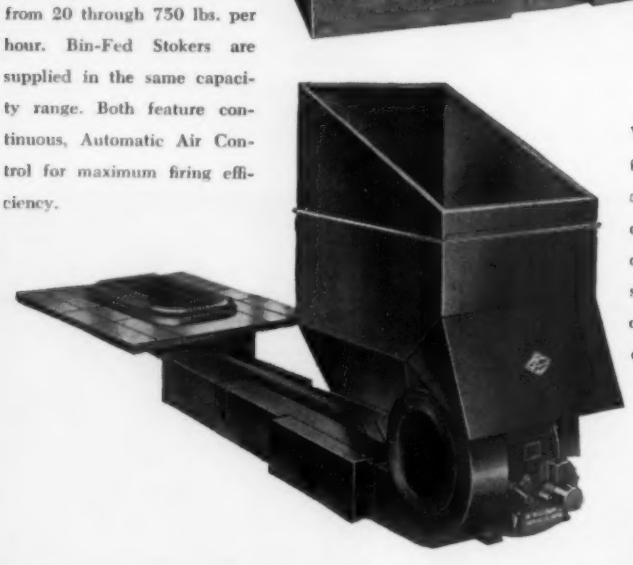


* Will-Burt Automatic Air Control unit

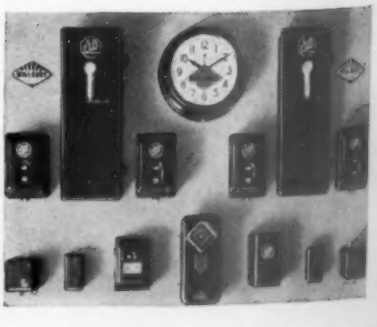
* In the "X-ray" view at the right you see the Will-Burt self-actuating automatic air control . . . an integral part of every Will-Burt hopper or bin fed stoker. Sensitive, minute by minute, to ever changing fuel bed conditions, it unfailingly corrects air intake to that needed for most efficient use of fuel. Result; less heat dissipated up the stack . . . less unburned, wasted fuel . . . less custodian supervision and *more BTU's, or heat energy units, for your fuel dollar.*



Will-Burt Hopper Stokers—with open or closed hoppers, are supplied in capacities from 20 through 750 lbs. per hour. Bin-Fed Stokers are supplied in the same capacity range. Both feature continuous, Automatic Air Control for maximum firing efficiency.



Will-Burt Panel Control Systems are based on standardized basic control circuits and can be arranged for scheduled operation of one, several, or any combination of stokers.



Ask your building consultant about the safety factors of coal heating. Write for the Will-Burt story, "The Logic of Stoker Heating," and for our Engineering Manual.

You can depend on coal heat, fired with a Will-Burt Stoker to fulfill requirements of planned economy, with a factor of greater safety.

The WILL-BURT Company

OUR TWENTY-SIXTH YEAR IN THE STOKER BUSINESS

P. O. BOX 908, ORRVILLE, OHIO

MORSE BOULGER DESTRUCTOR CO.

80 Fifth Ave., Dept. HYB, New York 11, N. Y.

AGENTS IN PRINCIPAL CITIES

PRODUCTS

Incinerators of all types for the destruction of garbage and rubbish, and anatomical wastes from infirmaries or laboratories, in combination or separately. General types are Cell and Hearth for General Medium and Heavy Duty Service (Morse Boulger); Flue-Fed for Multiple Floor Service in Buildings (Kernerator); Ready-Built (Bricked-in or Portable) for Basement Service in Buildings (Kernerator).

Send for literature. Ask for Bulletin No. 180.

MORSE BOULGER INCINERATION

All authorities agree that the complete destruction by incineration of trash before it accumulates is the best way to safeguard school buildings from fire. They also agree that the incineration of garbage and anatomical wastes from kitchens, laboratories and infirmaries is the surest way to destroy any disease carrying elements and to eliminate flies and odors. The design of Morse Boulger Incinerators is such as to provide complete destruction of all combustible products. Hundreds of schools and colleges have Morse Boulger Incinerators.

ENGINEERING SERVICE

We can offer school authorities sixty years of the broadest experience in the field of incineration, including problems peculiar to schools, colleges and institutions. Our engineers will be glad to discuss your problems with you or your architect-engineer and recommend the best type of incineration to take care of your school's requirements. Keep in mind it is usually practicable to handle both wet and dry wastes in the same incinerator provided it is designed properly for such combination service. Morse Boulger Incinerators may be arranged for oil, gas, coal or wood firing or, where dry trash only is handled, will often operate without fuel.

GUARANTEE

Morse Boulger Incinerators are guaranteed as to correctness of design, materials, workmanship and performance. Morse Boulger Destructors are installed by our own skilled field crews.

MORSE BOULGER INCINERATORS

TYPE A . . . This incinerator, being a general utility unit where proportions of rubbish and garbage may vary widely, is probably the best of our several types for handling school destructible wastes. It will usually handle without auxiliary fuel any combination of dry rubbish and wet garbage up to 50% garbage content. Wet garbage up to 60% of rated capacity can be burned with oil, gas, coal or wood as the fuel. The incinerator can be located in the basement or housed in a separate small building.



The Type A Morse Boulger Incinerator comes in 6 different standard sizes, with capacities (based on dry rubbish) ranging from 125 to 900 pounds per hour. Larger sizes are available. If the Type A Incinerator will not take care of your problem, we have numerous other types of incinerators each best for handling certain kinds of wastes.

KERNERATORS

Where incineration requirements call for multiple floor service, as in a school infirmary for example, the Flue-Fed Kernerator would probably be best. As many floors as desired can be accommodated, each floor having its own hopper door in a common chute which leads to the incinerator in the basement. If the material is not self-combustible, as with dry trash and rubbish, arrangements can be made to fire the unit with gas, wood or coal.

Another Kernerator finding wide use in small buildings such as dormitories, etc., is the Ready-Built Type. This comes either "bricked-in" and connected directly to the furnace chimney or the "portable" type which is set anywhere on the basement floor and connected to the chimney by ordinary furnace piping. Both types are gas fired when the material destroyed is not self-combustible.

CENTURY BRASS WORKS, INC.

1100 North Illinois Street, Belleville, Illinois

Manufacturers of Sanitary Drinking Fountain Equipment Since 1917

Century FOUNTAINS

One of America's Fastest Growing Lines

Year after year CENTURY'S share of the nation's drinking fountain business increases. Schools, public institutions, industry, architects, engineers, wholesalers, builders and plumbing contractors are responsible. They recognize CENTURY QUALITY—when they specify and insist on CENTURY SANITARY DRINKING FOUNTAINS they are getting the FINEST AVAILABLE.

Century Automatic Volume Control BUBBLER HEADS

No. 700 - and - No. 900-S

feature automatic stream control which is built into the Bubbler Head itself, thereby eliminating the necessity of a separate flow regulator.

These patented bubblers are self-adjusting to normal variations in water pressure. They maintain a constant desirable drinking stream at all times—one which will not exceed the limits of the receptor.

Add to this CENTURY'S positive ANTI-SQUIRT feature and you can readily see why CENTURY AUTOMATIC BUBBLERS and FOUNTAINS are so tremendously popular in our nation's schools and industrial plants.

For greater SAFETY, SANITATION and CONSERVATION of water, plus continual TROUBLE-FREE SERVICE, insist on the finest . . .



No. 700



No. 900-S



No. 9-20



No. 9-18



No. 9-46



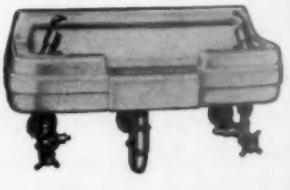
No. 6-45

Century SANITARY DRINKING Fountains

NOTE: Practically all Century Fountains are designed with elevated bubbler bases to meet the most rigid health and sanitary codes.



No. 6-67-3



◀ No. 6-40 A

A Modern Sanitary Drinking Fountain Available for Every Requirement

COMPLETE CATALOG FURNISHED ON REQUEST

C-3/Po

THE POWERS REGULATOR CO.

Established 1891

Skokie, Ill. • Offices in Chief Cities listed on Page 4

Pneumatic Systems of Automatic Temperature Control for all Types of Heating and Ventilating

Also the most complete line of Thermostatic Controls made for Water Heaters and all types of Shower Baths, see page 3.

MODERN CONTROLS FOR MODERN SCHOOL BUILDINGS



SMALL SIZE

Fits into narrow vertical spaces. Dimensions for both standard or Day-Night thermostats: 5⅝" H x 2⅞" W x 2¼" D.

POWERS ROOM THERMOSTATS

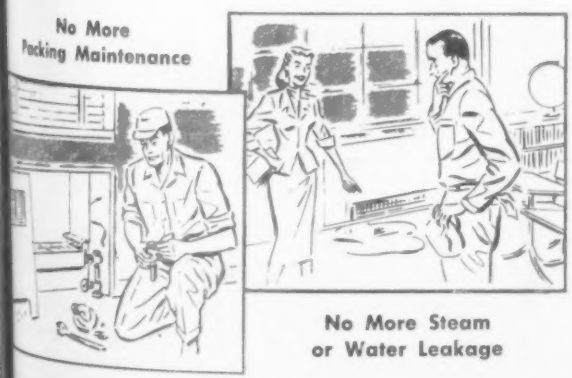
provide utmost comfort for teachers and pupils and maximum fuel economy. Users often report over 25 years of reliable low-maintenance-cost service. They are truly gradual acting and give smooth control of valves and dampers. Only two of the many styles available are shown above.

More Accurate Control with Powers PACKLESS Valves

For control of convectors, unit ventilators, radiators and radiant panel heating coils Powers PACKLESS Valves are superior in every way. Because they have no packing nut or gland to be tightened, oiled or adjusted there is no binding of valve stem as with conventional packing.

With their **duo-seal PACKLESS construction** (See B & C in drawing at right) and characterized throttling plug they give smooth control and insure correct flow of steam or hot water. Besides giving better performance they eliminate packing maintenance and leakage of water or steam.

No More Packing Maintenance



No More Steam or Water Leakage

For more than two generations the name POWERS has stood for quality products, proper installation, and SERVICE after installation whenever required.

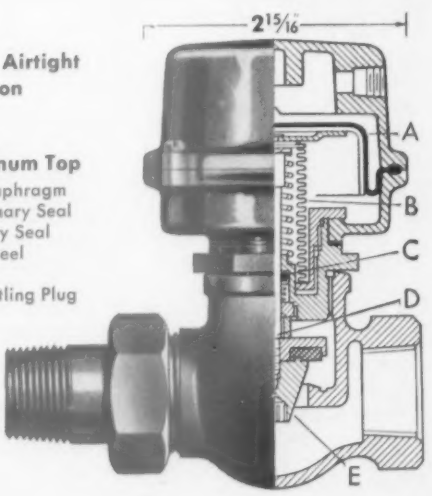
In discussing temperature control problems with Powers you can benefit from our many years of experience gained in thousands of schools from coast to coast and in prominent buildings at Harvard University, Massachusetts Institute of Technology, Carnegie Tech, Illinois Tech, U.C.L.A., California Institute of Technology, the U.S. Capitol building, UN Conference and Assembly Halls and in many other outstanding buildings.

Illustrated here and on page 2 are only a few of the many types of Powers control employed to regulate—

- **Unit Ventilator and Convector Systems**
- **Split Systems with Forced Ventilation and Convectors**
- **Radiant Panel Heating**
- **Warm Air Heating Systems with Single and Double Ducts**

For further information contact our nearest office shown on page 4 or write us direct.

Note Durable, Airtight Construction



Rugged Cast Aluminum Top

A) Durable Molded Diaphragm
B) Bronze Bellows, Primary Seal
C) "O" Ring, Secondary Seal
D) Polished Stainless Steel Valve Stem
E) Characterized Throttling Plug

Available in Various Types and Sizes

POWERS *NEW* Unit Ventilator Control System

Eliminates OVER-heated Classrooms and Insures Utmost Comfort and Fuel Economy

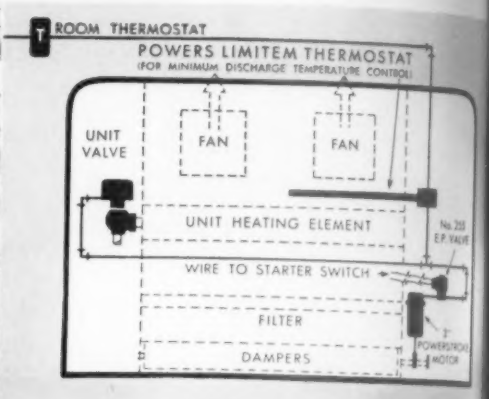
POWERS New



LIMITEM Low-Limit Airstream Thermostat

A Precision Instrument engineered to provide control for Unit Ventilator discharge temperatures—a critical requirement for classroom comfort.





POWERS

UNIT VENTILATOR TEMPERATURE CONTROL

Gives More Accurate Control with Less Maintenance

With its simple, direct control Powers gives close regulation without using complicated auxiliary devices. Thermostats, packless valve and damper operator are all engineered to give many years of reliable, trouble free service.

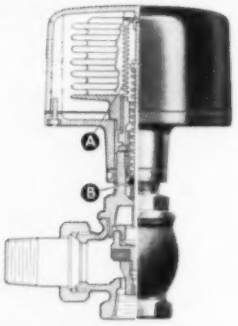
New LIMITEM Thermostat is the most accurate instrument made for low-limit control of unit ventilators. It incorporates such sound engineering principles as: Sturdy construction, accurate response, ingenious non-bleed double air valve to insure stable control with low hysteresis and Adjustable Sensitivity to give precise throttling range.

POWERS PACKLESS Control Valves are now standard for unit ventilators and convectors. You get a really modern temperature control system when you use POWERS. For further information contact your nearest Powers Office shown on page 4.

POWERS PACKLESS Control Valves

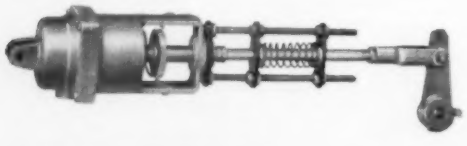
Specially Designed for UNIT VENTILATORS

To Insure Better Control, All Valves are carefully sized for each unit.



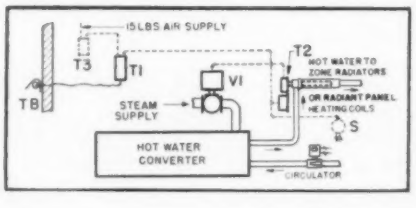
Special duo-seal construction (a) primary seal; (b) secondary seal) reduces valve stem friction, eliminates packing maintenance and gives smooth control. High lift poppet provides 3 times as much travel for ½" valve as compared with previous valves. Characterized throttling plug insures correct flow of steam or hot water.

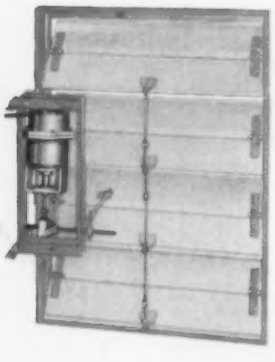
POWERSTROKE DAMPER OPERATOR, below: with hesitation spring gives smooth gradual operation of Unit Ventilator dampers.

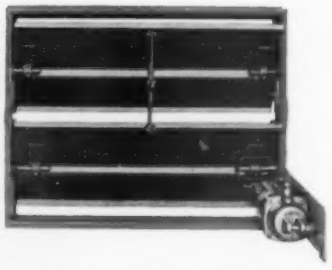


POWERS MASTROL SYSTEM of CONTROL for Forced Hot Water Heating and Panel Heating, etc.

Temperature of water is maintained in direct relation to weather outdoors. Controls are shown below. Performance records show it is unsurpassed for reliability and low maintenance cost.







Powers Modern Damper Operators are available in various types to operate all sizes and types of dampers.





Master-SubMaster Controls T1 and T2 are shown above. They regulate Powers **FLOWRITE** Valve V1 on right which controls flow of steam to hot water converter in above diagram of Powers **MASTROL** System of Control.

See List of Offices on Page 4.



Some of the more than 50 showers at Freeport, Ill., Junior High School safeguarded by Powers Mixers.



One of the 180 Showers in Shaw Memorial Dormitory at Michigan State College equipped with Powers Mixers.



60 Powers Mixers at Palatine, Ill., Twnp. High School.

DOUBLE SAFETY of POWERS Type H Thermostatic WATER MIXERS Makes Them Best for Individual Showers



No shower bath is really MODERN or SAFE without the full protection provided by Powers Mixers. They *always* hold shower temperature constant wherever the bather wants it regardless of **pressure** or **temperature** changes in water supply lines. Failure of cold water supply instantly shuts off the shower.

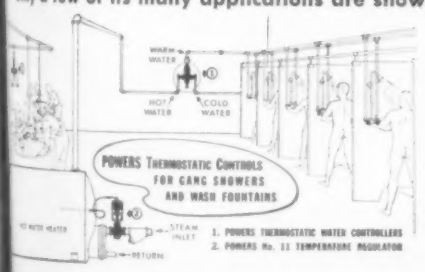
Because shower temperature is *thermostatically* limited to 115° F. by Powers mixers they give real protection against scalding caused by "dead-ends" in water supply lines.

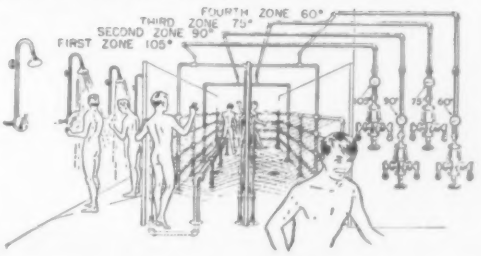
POWERS Mixers Save Water. No time or water is wasted by bather having to get out from under shower because of flucuating shower temperature. Water conservation feature alone makes Powers mixers a profitable investment.

Minimum of Maintenance. Their simple, durable construction insures years of dependable service. Contact our nearest office for further information, ask for **Bulletin 365.**

POWERS Thermostatic Water Controller for Multiple Type Showers

Only a few of its many applications are shown below. Bulletin 361 gives full information.





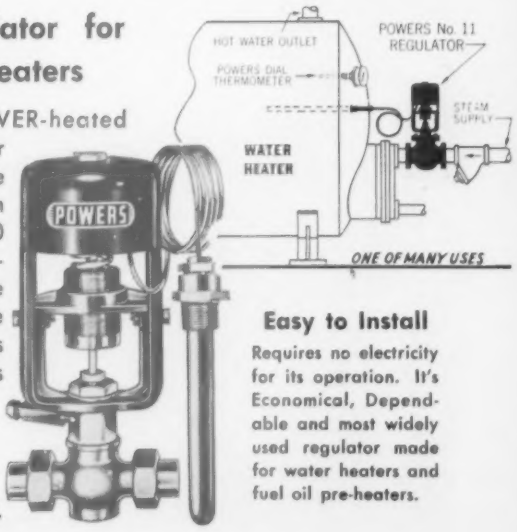


Capacities 22 to 125 gals. per min. @ 45 lbs. psi.

POWERS No. 11 Self-Operating Temperature Regulator for Water Storage Heaters



Automatically prevents OVER-heated water. Eliminates hot water complaints. Fuel savings alone often pay back its cost each year. Often lasts 15 to 20 years with minimum of maintenance. Once set for the proper temperature it can be forgotten. Bulletin 329 gives full information regarding its many superior features.



Easy to Install

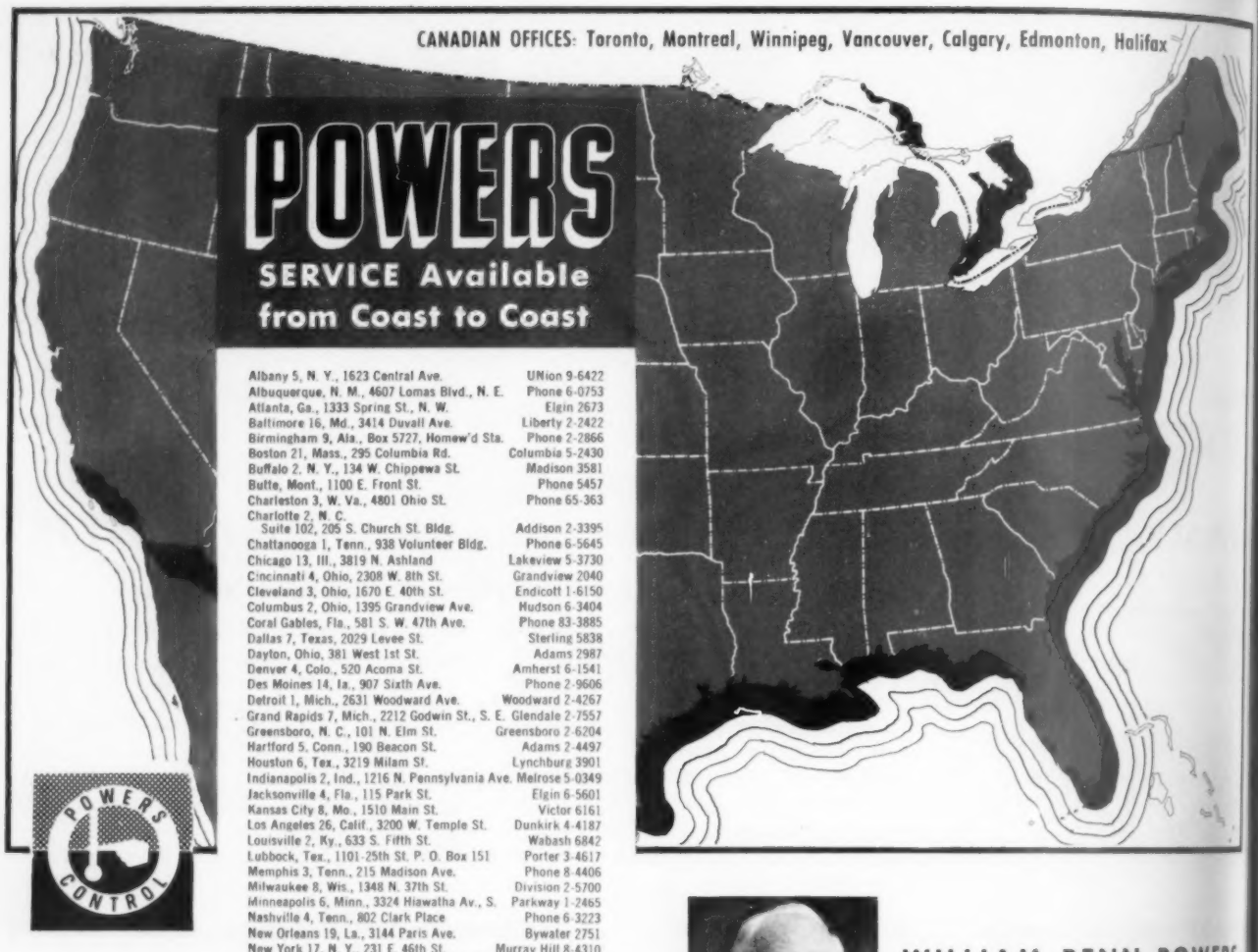
Requires no electricity for its operation. It's Economical, Dependable and most widely used regulator made for water heaters and fuel oil pre-heaters.

...e or Write Your Nearest POWERS Office Listed on Next Page for Bulletin 329.

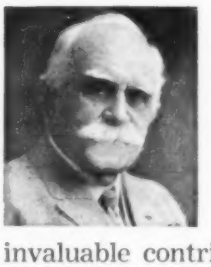
CANADIAN OFFICES: Toronto, Montreal, Winnipeg, Vancouver, Calgary, Edmonton, Halifax

POWERS

SERVICE Available from Coast to Coast



Albany 5, N. Y., 1623 Central Ave.	UNion 9-6422
Albuquerque, N. M., 4607 Lomas Blvd., N. E.	Phone 6-0753
Atlanta, Ga., 1333 Spring St., N. W.	Elgin 2673
Baltimore 16, Md., 3414 Duvall Ave.	Liberty 2-2422
Birmingham 9, Ala., Box 5727, Homew'd Sta.	Phone 2-2866
Boston 21, Mass., 295 Columbia Rd.	Columbia 5-2430
Buffalo 2, N. Y., 134 W. Chippewa St.	Madison 3581
Butte, Mont., 1100 E. Front St.	Phone 5457
Charleston 3, W. Va., 4801 Ohio St.	Phone 65-363
Charlotte 2, N. C. Suite 102, 205 S. Church St. Bldg.	Addison 2-3395
Chattanooga 1, Tenn., 938 Volunteer Bldg.	Phone 6-5645
Chicago 13, Ill., 3819 N. Ashland	Lakeview 5-3730
Cincinnati 4, Ohio, 2308 W. 8th St.	Grandview 2040
Cleveland 3, Ohio, 1670 E. 40th St.	Endicott 1-6150
Columbus 2, Ohio, 1395 Grandview Ave.	Hudson 6-3404
Coral Gables, Fla., 581 S. W. 47th Ave.	Phone 83-3885
Dallas 7, Texas, 2029 Levee St.	Sterling 5838
Dayton, Ohio, 381 West 1st St.	Adams 2987
Denver 4, Colo., 520 Acoma St.	Amherst 6-1541
Des Moines 14, Ia., 907 Sixth Ave.	Phone 2-9606
Detroit 1, Mich., 2631 Woodward Ave.	Woodward 2-4267
Grand Rapids 7, Mich., 2212 Godwin St., S. E.	Glendale 2-7557
Greensboro, N. C., 101 N. Elm St.	Greensboro 2-6204
Hartford 5, Conn., 190 Beacon St.	Adams 2-4497
Houston 6, Tex., 3219 Milam St.	Lynchburg 3901
Indianapolis 2, Ind., 1216 N. Pennsylvania Ave.	Melrose 5-0349
Jacksonville 4, Fla., 115 Park St.	Elgin 6-5601
Kansas City 8, Mo., 1510 Main St.	Victor 6161
Los Angeles 26, Calif., 3200 W. Temple St.	Dunkirk 4-4187
Louisville 2, Ky., 633 S. Fifth St.	Wabash 6842
Lubbock, Tex., 1101-25th St. P. O. Box 151	Porter 3-4617
Memphis 3, Tenn., 215 Madison Ave.	Phone 8-4406
Milwaukee 8, Wis., 1348 N. 37th St.	Division 2-5700
Minneapolis 6, Minn., 3324 Hiawatha Av., S.	Parkway 1-2465
Nashville 4, Tenn., 802 Clark Place	Phone 6-3223
New Orleans 19, La., 3144 Paris Ave.	Bywater 2751
New York 17, N. Y., 231 E. 46th St.	Murray Hill 8-4310
Oklahoma City 6, Okla., 1726 N. W. 5th St.	Forest 5-7212
Peoria Heights 4, Ill., 327 W. Glen Ave.	Phone 5-5710
Philadelphia 11, Pa., 6428 Rising Sun Ave.	Pilgrim 5-6700
Pittsburgh 16, Pa., 1612 Potomac Ave.	Locust 1-7720
Portland 6, Me., Box 132	Portland 6-2766
Portland 5, Ore., 921 Southwest Oak St.	Atwater 6543
Rochester 8, N. Y., 135 Spring St.	Baker 8058
St. Louis 8, Mo., 3805 Washington Ave.	Jefferson 1-3126
Salt Lake City 1, Utah, 204 Dooly Bldg.	Phone 4-6421
San Antonio 6, Tex., P. O. Box 689	Capitol 6-7229
San Francisco 3, Cal., 314 Seventh St.	Underhill 1-6643
Seattle 99, Wash., 2800 15th Ave. West	Alder 5717
Syracuse 4, N. Y., 509 N. Onondaga St.	Phone 76-0270
Tulsa 3, Okla., 910 South Boston	Phone 54-0709
Washington 6, D. C., 2039 "K" St., N. W.	Phone NA 8-3570
Wichita 2, Kansas, 216 E. Waterman Rm. 214	Amherst 5-1191
Honolulu 3, Hawaii, P. O. 2755	Phone 6401
Mexico City, D.F.	Apartado 63 Bis



WILLIAM PENN POWERS . . . with his invention of the first all pneumatic system of temperature control and gradual acting vapor disc thermostat made an invaluable contribution to the modern science of heating, ventilating and air conditioning.

Factory and General Office Building of **THE POWERS REGULATOR COMPANY** Skokie, Ill.

The World's Most Modern Factory Producing Automatic Temperature and Humidity Control



CORDLEY & HAYES

451 Fourth Ave., New York 16, N. Y.

FIRST IN WATER COOLING . . . SINCE 1889 . . . OVER 1,000,000 SOLD

Assure Cool Drinking Water

with

Cordley Electric Water Coolers

For kindergarten and primary grades

The Cordley low height model is built expressly for small children. Only 31 inches high. It contains the regular full size cooling system found in all standard models.





For general use

The Cordley bubbler line includes several models similar to the one illustrated ranging in size from 5 to 27 gallons per hour capacity. For cafeteria use, a glass filler can be attached to a convenient connection under the knock-out cap on the top plate. Also, all bubbler type coolers are equipped for installation of additional drinking water fountains to meet a wide variety of requirements.

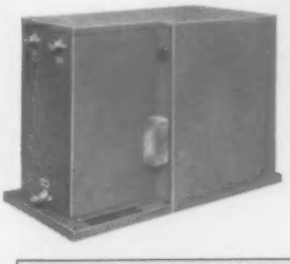
For storing food and bottled goods

Two models available with the refrigeration compartments—bubbler and bottle types. Contain approximately one cubic foot of storage space plus trays for 28 ice cubes.



For supplying water to fountains

Several remote models available ranging in size from 3 to 10 gallons per hour capacity. Ideal for connection to fixed drinking outlets. Take up minimum space (16″ x 34¾″ x 13⅞″) and can be installed on floors, shelves, closets, etc.



WATER COOLERS IS OUR BUSINESS

As a matter of fact, our sole business. And because we make no other type of equipment, our entire efforts are concentrated on top quality water coolers to reflect the sterling reputation built up over 65 years and the sale of more than 1,000,000 water coolers.

MODELS FOR EVERY DRINKING WATER NEED

The diversified line of more than 16 models comprising bubbler, bottle, refrigerator, remote, water-cooled and explosion-proof types makes available a water cooler for every drinking water need—in grade schools, high schools, colleges, auditoriums, laboratories, administration offices, etc.

WHERE TO OBTAIN THEM

Cordley Electric Water Coolers are available nationally through plumbing, industrial and other leading supply houses. Consult your classified directory or write to Cordley & Hayes.

BACKED BY THE BEST GUARANTY

Every Cordley Hermetic Cooler is guaranteed for five years. A new cooler will be supplied if a defect occurs in the hermetic factory-sealed refrigeration system or cooling tank and freight will be paid both ways within continental United States. All other electrical parts are also guaranteed for 5 years. Write for specimen copy of this unique guaranty with complete details.

NO OTHER COOLER IS GUARANTEED TO THIS EXTENT

CRANE CO.

GENERAL OFFICES: 836 S. MICHIGAN AVE., CHICAGO 5 • NATION-WIDE DISTRIBUTION THROUGH BRANCHES, WHOLESALERS, PLUMBING AND HEATING DEALERS

CRANE FIXTURES

part of sound school and university planning

Schools and universities do their planning from the long-range point of view. They know that generations of students will come and go—while school facilities must go on and on, year in and year out, with a minimum of maintenance.

That's why, when you build for permanence, you do well to consider Crane plumbing. Experience in schools across the country has shown that Crane is not only the *preferred* plumbing... it's the plumbing that means *permanence.*

Typical of the complete line of Crane equipment for schools and universities are the items shown here. Check them over whether your modernization plans call for remodeling or new construction. Then let your Architect or Plumbing Contractor know your preference for Crane.



Rhodile Lavatory 1-510-W. Long wearing cast iron enameled lavatory. 6" high back for wall protection. Spacious rectangular basin with soap depression. Chromium plated Vantage Dial-ese controls. Direct lift waste. Size: 20" x 18".



Oxford Lavatory 1-125-E. Smartly styled vitreous china. Rectangular basin with splash lip and soap depression. Chromium plated Whitney Dial-ese controls and direct lift waste. Sizes: 19" x 17", 20" x 14".



Norwich Lavatory 1-220-S. Functionally styled for practical service. Vitreous china lavatory on pedestal leg. 6" high back. Spacious rectangular basin with splash lip and soap depression. Easy action, chromium plated Embassy Dial-ese controls provide positive water control. Indirect lift waste. Sizes: 20" x 18", 24" x 21".



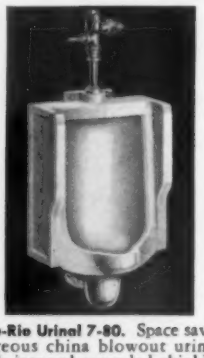
Walton Closet 3-450. Efficient Siphon jet closet with Sani-Black hard rubber open front seat with check hinge. Elongated rim, top spud bowl. Manually operated flush valve. Also available with back spud and concealed flush valve.



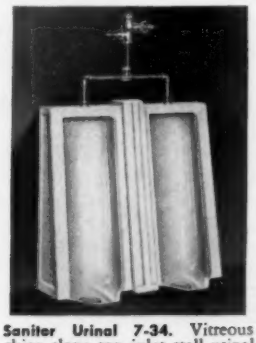
Santon Closet 3-300. Easy-to-clean closet with Sani-Black hard rubber open front seat with check hinge. Siphon jet elongated rim. Top spud bowl. Manually operated flush valve. Also available in Santon Jr. model. 13½" junior height.



Drexel Closet 3-127. Modern, close-coupled closet of vitreous china. Whirlpool action, elongated rim bowl with self-draining jet. White plastic closed front seat and cover.



Neu-Rio Urinal 7-80. Space saver vitreous china blowout urinal with integral extended shields, flushing rim and trap. Receding concave back to minimize splashing.

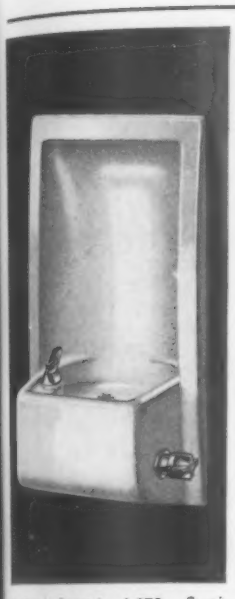


Saniter Urinal 7-34. Vitreous china slope top inlet stall urinal with integral flushing rim. Furnished singly or in batteries of two or three urinals with one flush valve. Vitreous china seam covers.

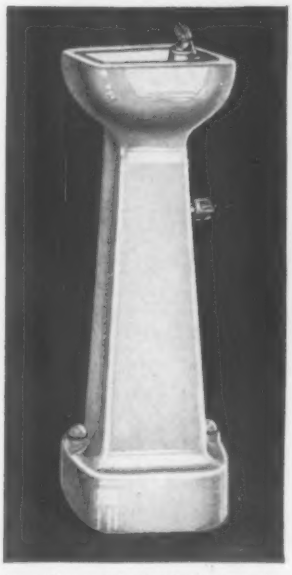


Sanuro Urinal 7-96. Siphon jet pedestal urinal of vitreous china. Simple design and rounded contours promotes cleanliness and sanitation. Royal exposed flush valve.

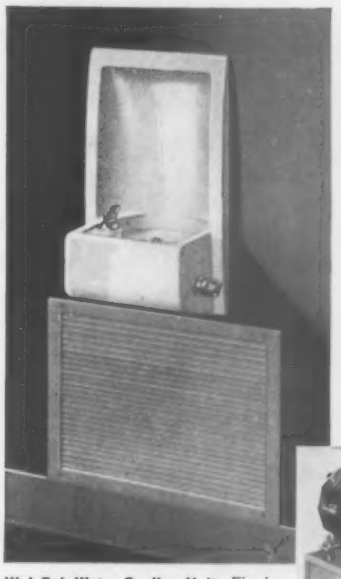
CRANE CO.



Coolbrook Fountain 6-570. Semi-recessed space saving drinking fountain of vitreous china. Elevated bubbler base to safeguard against back siphonage. Integral strainer. Purflo angle stream bubbler. Victor Magiclose control valve. Width 15". Height 26½". Projection 7¼".



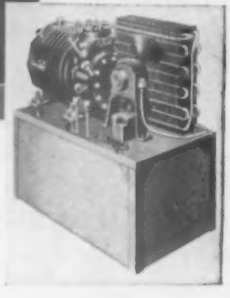
Corwith Fountain 6-504. An attractive pedestal type drinking fountain of gleaming vitreous china that will provide years of service. Has sanitary Purflo angle stream bubbler with automatic stream regulator, and Victor Magiclose self-closing valve. Size: 12½" x 12½" x 34" high.



Wal-Pak Water Cooling Unit. Fits inside wall. Also installable in nearby closet or basement. Two sizes for supplying one or two fountains. Can supply fountain on adjoining floor. Tamper-proof, noiseless, costs no more than exposed coolers. Can be used with any Crane drinking fountain.



Clearstream Fountain 6-515. Small modern designed vitreous china drinking fountain with integral strainer. Bubbler base located above receptor rim as safeguard against back siphonage. Purflo angle stream bubbler. Victor Magiclose self-closing valve. Width 12". Projection 13".



Efficient additions to your Home Ec Department



Somerday Sink 5-30-S. Single basin, acid-resisting porcelain enameled cast iron sink. Depressed drainboards, soap depressions, chromium plated Temple Dial-ese controls, retractable hose with thumb action spray. Receptol basket strainer waste. White baked enameled steel cabinets provide roomy storage space. Sizes: 54" and 60" x 25¼".



Stewardess Sink 5-103-S. Compact, single basin, single drainboard, acid-resisting, porcelain enameled cast iron sink. Chromium plated Embassy Dial-ese control. Receptol basket strainer waste. Baked enameled steel cabinets. Size: 42" x 22½". For right hand drainboard, specify 5-106-S.



Sink 5-131-S. For continuous counter installation. Acid-resisting, porcelain enameled, cast iron. Two-compartment flat rim sink with extended back ledge. Chromium plated Embassy Dial-ese controls with thumb control spray and retractable hose. Receptol basket strainer waste. Size: 32" x 21".

Crane products are readily available through Crane Branches, Crane Wholesalers, and local Plumbing Contractors

CRANE STARTS ITS SECOND CENTURY OF QUALITY
Founded July 4, 1855

Crane is 100 years old this year. And though we're proud of our age, we're prouder still of our reputation for looking ahead. That's why, when you buy Crane, you can be sure you're buying the most advanced plumbing made.

CRANE CO.

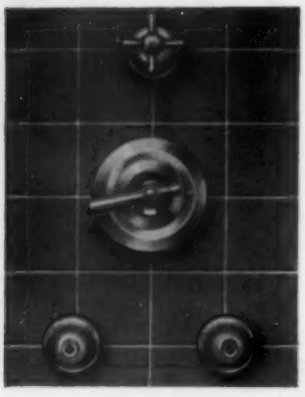
GENERAL OFFICES: 836 SOUTH MICHIGAN AVE., CHICAGO 5
VALVES • FITTINGS • PIPE
PLUMBING AND HEATING

LAWLER AUTOMATIC CONTROLS, INC.

453 North MacQuesten Parkway, Mt. Vernon, N. Y.

The LAWLER LINE of Thermostatic Control Valves

Since 1897 Lawler Automatic Controls, Inc. and its predecessor, Lawler Regulator Company, has designed and manufactured thermostatic equipment for automatically regulating the temperature of fluids, under predetermined conditions of pressure and volume. The firm has grown steadily until today it is one of the largest exclusive manufacturers of such devices.

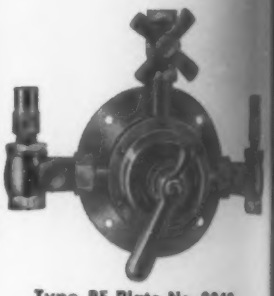


Type BC Plate No. 2113

SHOWER MIXERS
(one or two outlets)

Capacities: { type BE 5 GPM to 20 GPM; type BC 5 GPM to 20 GPM

Lawler Shower Mixers deliver water at the desired temperature to individual fixtures by thermostatically mixing hot and cold water. Delivered water temperature may be varied between "COLD" and "WARM" to the desired maximum, "HOT" by moving pointer handle. BC valve furnished with circular escutcheons. BE with wall plate, cast integrally with the body. Rough brass or polished chrome plate finish.



Type BE Plate No. 2042



Plate No. 2136

DEVELOPING TANK ASSEMBLY

Automatically controls the flow and temperature of water supplied to the developing tank. Several different and more elaborate assemblies are available. Rough brass, polished brass or chrome plate finish.

CABINET ASSEMBLIES

Lawler products can be supplied in complete cabinet assemblies or wall arrangements . . . built to meet particular specifications. Shown in plate no. 2139 is a Lane or Group shower assembly using a Lawler model BAM #3 thermostatic water controller.

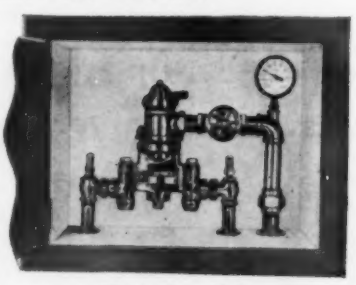


Plate No. 2139

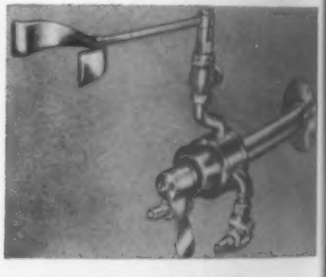


Plate No. 2072

KNEE OPERATED TYPE K

Allows accurate control of both volume and temperature of running water without using hands. Can also be supplied in pedal type.

WATER CONTROLLERS

For Group Showers

Capacities 15 to 200 GPM at 45 psi

Used where water at a predetermined temperature may be required from two or more outlets or from a single outlet where a large quantity is needed. Furnished complete with removable built-in strainers, check valves and union angle loose key stops. Finished in rough brass or polished chrome plate.



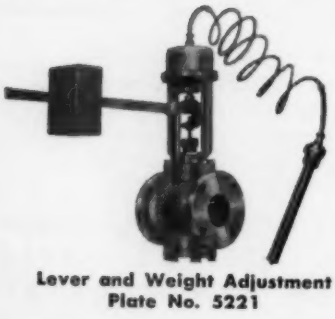
Type BAM Plate No. 5220

WATER PRESSURE EQUALIZERS

Maintain equal pressures to the fixtures in the hot and cold water lines, regardless of any variance of pressures in the supply lines.
Sizes: ½" up to and including 2"
Finish as desired: rough brass, white chrome or polished chrome plate



Plate No. 2059



Lever and Weight Adjustment
Plate No. 5221

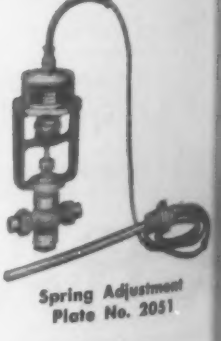
TEMPERATURE REGULATORS TYPE "S"

Accurately controls the temperature of steam-heated hot water and other liquids. Reverse Acting Type "S" regulators control cooling systems and recirculating lines.

Standard temperature ranges are adjustable over a spread of 40°F. They are:

Range No.	Degrees F.	Range No.	Degrees F.
J-4	100°-140°	M-8	140°-180°
K-6	120°-160°	N-10	160°-200°

Other temperature ranges can be furnished. SIZES: ¼" up to and including 5". Bronze or stainless steel trim. ¼" to 2" Bronze Body, Union, Ends; 2½" to 5" Iron Body, Flanged Ends. 2" both types.



Spring Adjustment
Plate No. 2051

SYMMONS ENGINEERING COMPANY

791 Tremont St., Boston 18, Mass.



SAFETYMIX

PROTECTS AGAINST SHOWER SCALDS

SAFETYMIX — The pressure-actuated non-scald shower valve is now standard equipment in schools and colleges everywhere. This is because sudden "scalds" in showers are caused only by *fluctuations of pressure*. SAFETYMIX gives positive control over these pressure changes. It is the only non-scald shower valve guaranteed to maintain discharge temperature within 2° F against pressure fluctuations up to 85% in either hot or cold supplies. Costs no more than ordinary valves, is simple to install and is as easy to fix as a faucet.

SOME SAFETYMIX USERS

Michigan State College, M. I. T., Dartmouth, U. of Cincinnati, Johns Hopkins, State Teachers, Wellesley, U. of Chicago, U. of Maine, Brown U., Conn. College, Holy Cross, Leland Stanford, Marquette U., Austing Public Schools, U. of Washington, DePau, Western Reserve, U. of Pittsburgh, Wm. & Mary, Loyola, etc., etc.

Symmons NEW ALL-PURPOSE FRE-FLO SHOWER HEAD



Simple, inexpensive, non-clogging unit with adjustable spray and volume control. Specially designed for water of high mineral content. Ball joint, polished chrome finish. Famous Symmons quality.

Symmons PUSHOWER . . . SAVES WATER

AUTOMATIC SHOWER LIMITER



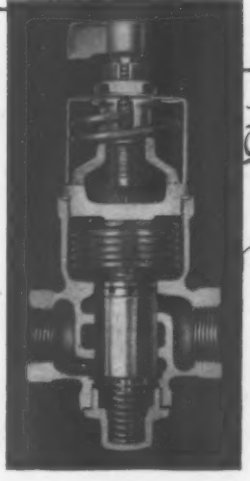
All parts accessible from front available in either exposed or concealed models with accessories as desired.

"PUSHOWER" GIVES YOU:

1. Water Savings
2. Lower H.W. Heating Costs
3. Smaller Supply Tanks
4. Positive Action
5. Easy Installation
6. Dependable Service
7. Symmons Quality

FOR FURTHER INFORMATION WRITE FACTORY DIRECT OR CONTACT NEAREST WHOLESALE PLUMBING DISTRIBUTOR

Symmons THERMOSTATIC TEMPERING CONTROLLER



T-C FACTS

1. Accurately maintains constant discharge temperature of hot water at outlet, regardless of tank or tankless heater temperature variations.
2. *Automatically* compensates for all normal pressure changes.
3. Install at heater as Master Control, or anywhere in line as a Zone Control.
4. Adjustable dial temperature settings from 90° F to 180° F. Automatically shuts down on failure of either supply.
5. A foolproof, thermostatic unit with sealed fill bellows mounted out of water in a protected chamber. Not subject to corrosion or deterioration. Interchangeable unit, easily replaced. Available in four sizes. Guaranteed Symmons quality

THE HALSEY W. TAYLOR CO.

Manufacturers of Drinking Fountains and Coolers

Warren, Ohio

AGENTS IN PRINCIPAL CITIES

PRODUCTS

Drinking fountains, pedestal, recessed and wall types. Water coolers, electric, and ice and bottle types.

DISTINCTIVE FEATURES THAT APPEAL TO ARCHITECT AND SCHOOL AUTHORITIES

Over the years Halsey Taylor Drinking Fountains have attained an enviable reputation for positive sanitation and conveniences in thousands of installations the world over. During the first world war and again in the second, these fountains won the approval of the Government and Military authorities as the ideal sanitary fountains, continually improved and refined. Halsey Taylor Drinking Fountains are today the most modern and dependable in use, for schools, hospitals, hotels, municipal and public buildings, churches and commercial and industrial operation.



It will pay you to investigate Halsey Taylor modern, sanitary drinking fountains which give you definite assurance of dependable, trouble-free service, proper health safety, maximum conveniences, built-in patented features exclusive with Halsey Taylor. Be sure, be safe, buy Halsey Taylor for health safety!

School authorities can be sure of health safety and long, dependable trouble-free service when they specify the correct Halsey Taylor fountain for their buildings. When requested, installations can be made vandal-proof.

1—**Practical Automatic Stream Control**—Automatic device maintains constant height in drinking stream regardless of line pressure variation. Stream never too high, never too low.

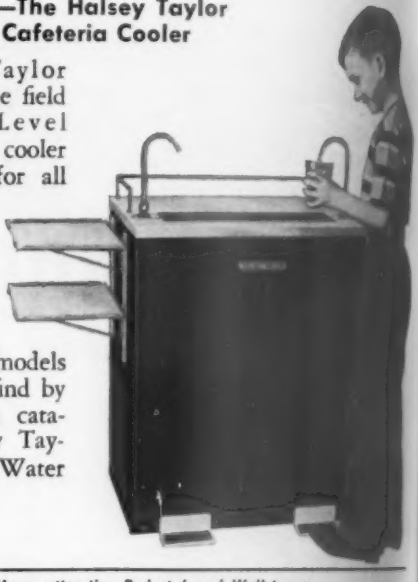
2—**Ideal Drinking Mound**—The two-stream projector with latest type guard makes the side stream both practical and health-safe, removing objections found with ordinary side-streams.

3—**Definite Sanitation**—Drinking mound formed by converging of two streams of water, setting up a localized drinking mound which makes it impractical to drink from any other point. Fingers or lips cannot come in contact with or contaminate water source.

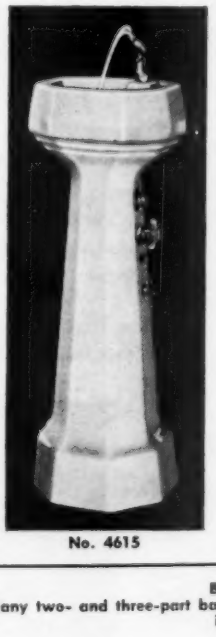
Fountains for every requirement: This page shows you but a few of the various types of the Halsey Taylor drinking fountains. There is a model for your every need, all of them modern in styling and all incorporate the exclusive Taylor features. Write today for a complete catalog.

It's Practical—The Halsey Taylor LO-LEVEL Cafeteria Cooler

Halsey Taylor again leads the field with a Lo-Level cooler, the cooler that is ideal for all places where small children congregate. This is but one of the many distinctive models that you will find by writing for a catalog of Halsey Taylor Electric Water Coolers.



Many attractive Pedestal and Wall types



No. 4615

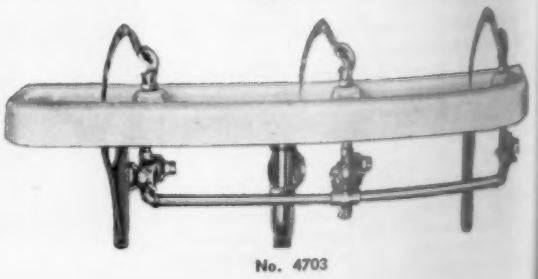


No. 4914



No. 4901

Battery Types
Many two- and three-part battery types especially adapted to school installations



No. 4703

ELECTRIC-AIRE ENGINEERING CORP.

209 W. Jackson Blvd. • Chicago 6, Illinois

SPECIALISTS IN ELECTRIC DRYING—34 YEARS of RESEARCH and EXPERIENCE in the DEVELOPMENT of ELECTRIC DRYERS

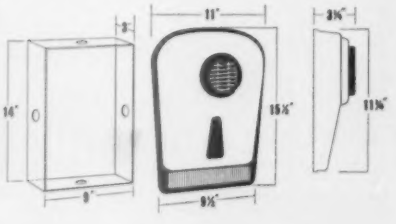
NEW "C" MODELS ELECTRIC-AIRE HAND DRYERS

CHOSEN BY LEADING SCHOOL SYSTEMS—SPECIFIED BY SCHOOL ARCHITECTS



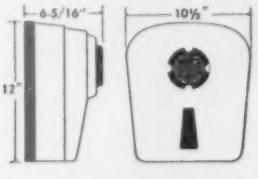


RECESSED MODEL—for installation in new or remodeled walls. Steel wall box is rigidly built into wall during construction. Mechanism and cover plates easily installed on completion of building. **Special built-in air filter** is quickly and conveniently cleaned without removing cover from dryer.





SURFACE MODEL—for quick, easy mounting on existing walls. Special three-point mounting eliminates vibration, reduces installation costs and insures safe mounting on uneven walls.



SPECIAL FEATURES

- Nylon plastic, non-conducting air baffle guard and starter bar. "Boy-Proof"—specially designed for school and public washroom use.
- New type air baffle—baffles air in any direction to provide convenient face, and fore-arm drying.
- Attractive, durable all-steel, porcelain enameled housing—non-breakable, non-chipping.
- Electric-lighted drying instructions built into the housing—lights at a touch of the starter bar—turns off automatically. Insures fast drying.
- All working parts easily accessible for renewal of motor brushes, cleaning and annual inspection. Life lubricated ball bearings reduces servicing to a minimum.
- Non-breakable, *permanent type air filter*. Quickly and easily brushed without removing cover.
- Greatly increased Uni-flow air volume and velocity makes Electric-Aire the fastest drying unit on the market—20 seconds for hands, 30 seconds for face and hands.

SPECIFICATIONS

- Direct motor driven fan, *vertically mounted*—insures extra long life, maintains uniform balance.
- 1/10 H.P. self-cooling motor with life-lubricated sealed ball bearings. Protected by 1.6 amp. fusetron. *Special long life brushes*—1500 hours, representing over 1,000,000 drys.
- Quickly removable, interchangeable mechanism—three point *rubber mounted* to eliminate vibration and shock.
- TWENTY-FIVE PERCENT (25%) LESS Current consumption—only 15 amps. More economical than conventional types.
- Thermo-fused circuit breaker eliminates burned out heating elements. *Three times heavier* than other types.
- Completely insulated and shock proof—SAFE, DEPENDABLE.

110-25 A.C.; 60 cycle motor—life lubricated ball bearings; consumption 15 amps.
Underwriter's Laboratory Approved.



ELECTRIC-AIRE HAIR DRYERS

Speed Up Traffic

Recognized by leading authorities as the fastest and most efficient of hair dryers. Thoroughly drys the heaviest head of hair in three minutes. Helps prevent colds. Has special filter-guard that eliminates danger of hair being drawn into dryer. One or three minute timing cycle optional.

WRITE FOR *NEW ELECTRIC DRYER LITERATURE*

Architects: Request AIA File 31-L—containing mounting drawings, detail specifications and catalog sheets.

School Officials: Request washroom maintenance file 31-M—containing towel cost-comparison with Electric-Aire operations, list of users and prices.

ELECTRIC-AIRE ENGINEERING CORP. Dept. W
209 W. Jackson Blvd. • Chicago 6, Illinois
ELECTRIC-AIRE CO. of CANADA
669 Talbot St. • St. Thomas, Ontario

GENERAL ELECTRIC COMPANY

Apparatus Sales Division

Schenectady 5, N. Y.



Top-quality General Electric ballasts provide quiet, flickerless operation of fluorescent fixtures in well-lighted classrooms like this one.

SAVE LIGHTING DOLLARS—*Specify Quiet G-E Sound-rated Fluorescent Ballasts*

The light and life of every fluorescent lamp depend upon a current-limiting device called a ballast. A leading lamp manufacturer has stated: "Tests indicate that ballasts which deliver improper values reduce lamp life by as much as 50 per cent and light output as much as 30 per cent below ratings." Every G-E ballast is designed to operate 10 per cent cooler than industry standards. This means longer life for your fluorescent installations and a real saving in lighting dollars.

To help you select a lamp-ballast combination to meet the sound requirements of your installation, General Electric conducts extensive tests to measure the average sound level of each ballast model. This measurement is called "Sound Rating." This exclusive G-E feature enables you to specify a model sound-rated to meet the needs of your fluorescent installation. You save money by reducing expensive noise complaints.

When your school installs new fluorescent fixtures or replaces old ones, make sure you obtain the economies that result from the use of good ballasts. Specify General Electric. For further information, call your nearest G-E Apparatus Sales Office, or write to *General Electric Company, Section 640-423, Schenectady 5, New York.*



G-E ballasts operate more quietly than average ballasts, and G-E engineers are constantly testing new materials and methods in order to better control ballast noise.

GENERAL ELECTRIC

better lighting for better vision with Sunbeam

C-5/Su

visionaires



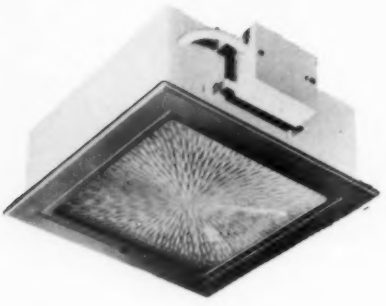
BETTER LIGHTING FOR BETTER VISION IN YOUR CLASSROOMS

Of all environments for human activity, the classroom requires the most conscientious consideration for proper illumination. Through sight comes most knowledge. Scientifically planned lighting will eliminate most visual discomforts and permit your students to advance more rapidly in their studies. Ask for Sunbeam lighting to be installed in your new or remodeled classrooms.

SUNBEAM LIGHTING COMPANY

777 EAST 14TH PLACE · LOS ANGELES 21, CALIF.

A



50301 *recessed incandescent*



60301-D *recessed incandescent*

These luminaires are typical of a very extensive line of recessed, incandescent units specially designed to produce warm, friendly tones of lighting in auditoriums, cafeterias, lobbies and corridors. These Sunbeam fixtures utilize scientifically designed prismatic reflectors and lenses which give precise control of the light distribution to meet specific illumination requirements. Light is taken out of the glare zone and projected within the more useful work zone. In lay terms this means that you get more efficient and more comfortable lighting.

B

The design of Sunbeam lighting for schools is based on, and generally exceeds, the recommended practices of the American Standards Association and the Illuminating Engineering Society's studies. Electrical safety is positively assured by the Underwriters' label which all Sunbeam luminaires carry. Efficient light distribution, low, comfortable brightness, minimum maintenance and easy installation are a few of the important features you get in Sunbeam Visionaires.® Our own photometric laboratory for the design and testing of luminaires is one of the most completely equipped for its type in the country. Cataloged here are but a few of many Sunbeam units having specific application to school lighting.

Of the several types of indirect, incandescent, concentric louver luminaires, Sunbeam's 2500 series is shown below. These units are specially designed for school lighting where low initial cost is of prime consideration. Exceptional low brightness and high efficiency which contributes to comfortable illumination are featured by these units. The rings are finished in matte white and the socket housing is finished in heat-resistant silvertone. Electrical parts are U.L. approved. Available for pendant or ceiling mounting and to take from 300 to 1000 watt silvered bowl lamps. Units with 7½ or 45 degree ball aligners also available for earthquake-proof construction or inclined ceiling installations.

C





2500 SERIES

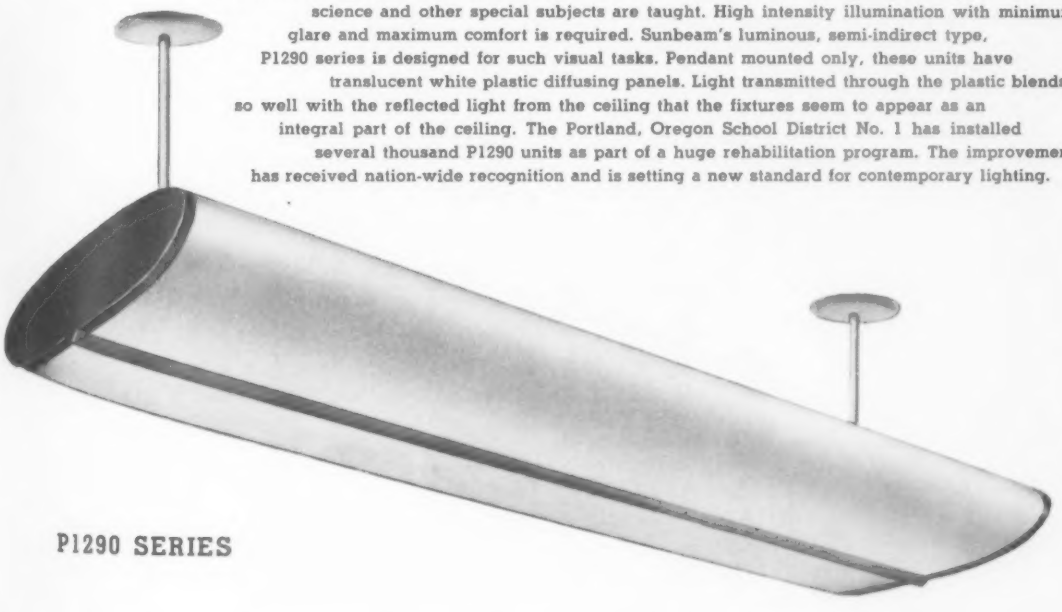
silvered bowl type incandescent



L1780 SERIES

It would be difficult, if not impossible to find an equal to Sunbeam's versatile L1780 series. The very shallow, contemporary design of these units make them specially suitable for low ceiling areas where high, uniform illumination and low, comfortable brightness are required. One of the most effective luminaires for good school lighting, they have Alba-lite glass side panels, silver-toned end plates and easy-to-remove louver assembly. The louver provides 45° longitudinal shielding, greatly reducing glare in high intensity areas. Installed in many schools and universities of which Michigan Tech, Hancock, Mich.; Spring Valley School, Spring Valley, Wis.; Cerebral Palsy School, San Francisco; and Kennedy School, Mishawaka, Ind., are typical.

Critical seeing conditions are found in classrooms in which drawing, typing, sewing, science and other special subjects are taught. High intensity illumination with minimum glare and maximum comfort is required. Sunbeam's luminous, semi-indirect type, P1290 series is designed for such visual tasks. Pendant mounted only, these units have translucent white plastic diffusing panels. Light transmitted through the plastic blends so well with the reflected light from the ceiling that the fixtures seem to appear as an integral part of the ceiling. The Portland, Oregon School District No. 1 has installed several thousand P1290 units as part of a huge rehabilitation program. The improvement has received nation-wide recognition and is setting a new standard for contemporary lighting.



P1290 SERIES

SUNBEAM LIGHTING COMPANY
777 E. 14th Place, Los Angeles 21, California



L1280 SERIES

This advance luminaire design also set a new trend in more effective school lighting when first introduced by Sunbeam Lighting Co. Contemporary styling, efficient light distribution and novel features for easy installation and minimum maintenance are engineered into these all-white L1280 series. Side panels are white plastic and the one-piece louver provides 32° lengthwise shielding. 45° shielding also available. For all metal Visionaires® of similar style with illuminated metal side panels inquire about the L1220 series. Of hundreds of school installations using Sunbeam's L1280 series the following are typical: Wilson H.S., St. Paul, Minn.; Catholic Central H.S., Adrian, Mich.; Queen Anne H.S., Seattle, Wash. and Ala Wai School, Honolulu, Hawaii.



HLB5600 *low brightness Controlens**



HNH5600 *curved Controlens**

Specific school lighting applications for Sunbeam's recessed, fluorescent #5600 series are so numerous that it would be impossible to describe them here. The two units illustrated have prismatic Controlenses.* These scientifically control the light so that the major portion of the light output is directed downward to desk level and greatly reduce glare from normal viewing angles. Both units produce the most effective illumination at maximum comfort. Consult Sunbeam lighting engineers for several other types of diffusing media in this series.

* Ⓡ Holophane Co., Inc.



L1280 series: Library at Claremont College, California



This single-lamp Visionaire is specifically designed to provide efficient illumination in narrow areas such as corridors, between library stacks and storage files. Most of the light is projected outward to walls or other vertical planes where quick identification and readability is important. Direct glare is greatly reduced from underneath the fixtures by a longitudinal channel which also supports the louver assembly.

L331 SERIES



L1500 series: Harper Elementary & J.H.S., Houston, Texas

SUNBEAM visionaire LIGHTING COMPANY

Improper lighting imposes a great risk of impairing vision and of impeding learning. Work and study have increased in tempo making more demands for visual acuity and reflective responses. You owe it to yourself and your students to provide an optimum visual environment. Achieve this simply by specifying SUNBEAM lighting throughout your school, college or school district. Take advantage, without obligation, of the most advanced thinking in illuminating engineering by consulting us direct or one of our representatives located in many cities across the country. Upon your request, we will gladly send complete information on our school lighting fixtures and help you with your lighting problems.



P1290 series: San Jose State College, California

SUNBEAM LIGHTING COMPANY

777 East 14th Place, Los Angeles 21, California

BENJAMIN ELECTRIC MFG. CO.

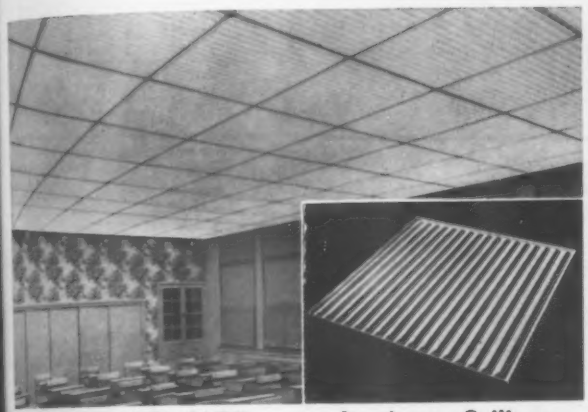
General Offices: Des Plaines (Chicago Suburb), Ill.

435-37 W. 19th
NEW YORK

20 N. Wacker Drive
CHICAGO

829 Folsom St.
SAN FRANCISCO

LIGHTING INTERIOR AREAS



BENJAMIN "PANEL-GLO" Luminous Ceilings

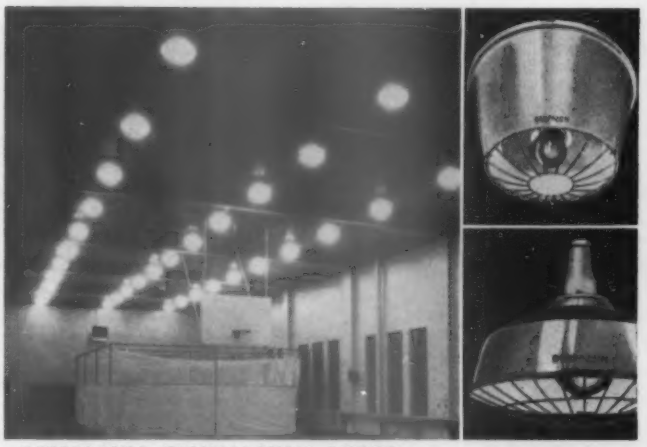
Benjamin "Panel-Glo" is an outstanding engineering development in wall-to-wall luminous ceilings. It can be installed on all common type ceilings such as plaster, wood, concrete or tile. "Panel-Glo" can be ordered on a square foot basis, with or without strip lighting, under one catalog number.

The new "Panel-Glo" is a corrugated (3' x 3') panel supported by framework of standard "V" channels and a wall finishing strip, which allows panels to be brought right to the walls.

Material: Translucent, white vinylite which is odorless, non-toxic, de-staticized and will not distort or shrink due to water absorption. It is highly resistant to most common chemicals and does not support combustion.

Panels are notched for secure locking. Vents allow circulation of air between upper and lower room areas. Acoustical baffles are also available.

"Panel-Glo" systems are listed by the Underwriters' Laboratories and approved by Factory Mutual Laboratories.



BENJAMIN GYMNASIUM UNITS
For Lighting Indoor Play-Areas

In addition to protection against jars and hard knocks, Gymnasium Lighting Units must provide good general illumination, so that fast-flying objects, such as basketballs can be readily seen by player and spectators.

This completely guarded, canopy type unit with 18" diameter porcelain enameled reflector (see top right illustration) assures good illumination over both horizontal and vertical surfaces. Opening in guard permits passage of lamp.

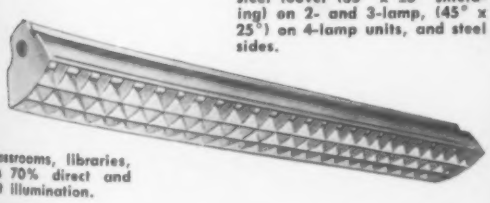
Watts	Canopy Dia.	Hgt.	Cat. No.
200,500	24"	13½"	6301

The Benjamin 22" "Silvered-Lamp" Gymnasium Unit effectively utilizes the indirect lighting properties of the silver bowl lamp (see bottom illustration at right). A heavy steel wire guard provides lamp protection. Large hole in center allows easy lamp changing.

Watts	Dia.	Hgt.	Mounting	Cat. No.
750-1000	22"	17¾"	Pendent	5415
750-1000	22"	17¾"	Ceiling	5416

BENJAMIN LEADER
"SCHOOLMASTER" SERIES

Individual units listed have steel louver (35° x 25° shielding) on 2- and 3-lamp, (45° x 25°) on 4-lamp units, and steel sides.



Ideal for classrooms, libraries, etc. Provides 70% direct and 30% indirect illumination.



Cat. No.*	No. and Type of Lamps	Dimensions—In. Length	Width	Depth
SM-240	2-40W. Bi	48⅞	12⅛	8⅞
SM-340	3-40W. Bi	48⅞	12⅛	8⅞
SM-440	4-40W. Bi	48⅞	12⅛	8⅞
SM-248	2-48", T12 Slim	48⅞	12⅛	8⅞
SM-348	3-48", T12 Slim	48⅞	12⅛	8⅞
SM-448	4-48", T12 Slim	48⅞	12⅛	8⅞
SM-296	2-96", T12 Slim	96⅞	12⅛	8⅞
SM-396	3-96", T12 Slim	96⅞	12⅛	8⅞
SM-496	4-96", T12 Slim	96⅞	12⅛	8⅞

*For 110-125V oper. (Other voltages available). FS-4 starters standard on Bipin Units.



Individual units listed have steel sides and steel louver (35° x 25° shielding).

BENJAMIN LEADER "VARSITY" SERIES



The economical unit for classrooms, libraries and offices. Provides 60% direct and 40% indirect illumination.

Cat. No.*	No. and Type of Lamps	Dimensions—In. Length	Width	Depth
V-240	2-40W. Bi	48⅞	12⅛	6¼
V-248	2-48", T12 Slim	48⅞	12⅛	6¼
V-272	2-72", T12 Slim	72⅞	12⅛	6¼
V-296	9-96", T12 Slim	96⅞	12⅛	6¼

*For 110-125V oper. (Other voltages available). FS-4 starters standard on Bipin Units.

BENJAMIN LIGHTING EQUIPMENT FOR INTERIOR LIGHTING

BENJAMIN LEADER "OFFICER"



A streamlined and beautifully proportioned fixture that adds glamor to any school interior. Has hinged molded louver. Individual units listed at right have 31° plastic louver and curved plastic sides. Also available: 45° plastic louver; white enameled steel sides; stem suspensions; units for continuous line mounting.

Cat. No.*	No. and Type of Lamps	Dimensions—in. Length	Width	Depth
VL-240-31°P	2-40W. Bi	53⅜	10¼	5½
VL-340-31°P	3-40W. Bi	53⅜	10¼	5½
VL-440-31°P	4-40W. Bi	53⅜	16¼	5½
VL-248-31°P	2-48", T12 Slim	53⅜	10¼	5½
VL-348-31°P	3-48", T12 Slim	53⅜	10¼	5½
VL-448-31°P	4-48", T12 Slim	53⅜	16¼	5½
VL-296-31°P	2-96", T12 Slim	101¼	10¼	5½
VL-396-31°P	3-96", T12 Slim	101¼	10¼	5½
VL-496-31°P	4-96", T12 Slim	101¼	16¼	5½

*For 110-125V. oper. (Other voltages available). Bipin Units listed have FS-4 Starters. No-Blink Starters also available. Units also available for 2, 3, and 4, 48", T12 Rapid Start Lamps.

BENJAMIN LEADER "PTE"



Designed to meet the problems encountered in school lighting today. Individual units listed at right have Alba-Lite glass sides and Alba-Lite glass hinged bottom. May be mounted individually or in continuous lines. Also available with molded plastic louver (40° x 40°) shielding; Lucite Lens; plastic sides; stem suspensions.

Cat. No.*	No. and Type of Lamps	Dimensions—in. Length	Width	Depth
PTE-240	2-40W. Bi	48⅛	14⅝	6⅛
PTE-340	3-40W. Bi	48⅛	14⅝	6⅛
PTE-440	4-40W. Bi	48⅛	14⅝	6⅛
PTE-248	2-48", T12 Slim	48⅛	14⅝	6⅛
PTE-348	3-48", T12 Slim	48⅛	14⅝	6⅛
PTE-448	4-48", T12 Slim	48⅛	14⅝	6⅛
PTE-296	2-96", T12 Slim	96⅛	14⅝	6⅛
PTE-396	3-96", T12 Slim	96⅛	14⅝	6⅛
PTE-496	4-96", T12 Slim	96⅛	14⅝	6⅛

*For 110-125V. oper. (Other voltages available). Bipin Units listed have FS-4 starters. No-Blink Starters also available. Units also available for 2, 3, and 4, 48", T12 Rapid Start Lamps.

BENJAMIN LEADER "NEW VARSITY"



A beautiful, quality engineered fixture. Ideal for drafting rooms, libraries, offices and classrooms. Affords large amounts of glareless light, with the use of 40° x 40° egg-crate louver and ribbed plastic sides. May be mounted individually or in continuous line. Units are available with stem suspensions.

Cat. No.*	No. and Type of Lamps	Dimensions—in. Length	Width	Depth
NV-240	2-40W. Bi	48½	13⅜	6"
NV-340	3-40W. Bi	48½	13⅜	6"
NV-440	4-40W. Bi	48½	13⅜	6"
NV-248	2-48" Slim	48½	13⅜	6"
NV-348	3-48" Slim	48½	13⅜	6"
NV-448	4-48" Slim	48½	13⅜	6"
NV-296	2-96" Slim	96½	13⅜	6"
NV-396	3-96" Slim	96½	13⅜	6"
NV-496	4-96" Slim	96½	13⅜	6"

*For 110-125V. oper. (Other voltages available). Bipin Units listed have FS-4 starters. No-Blink Starters also available. Units also available for 2, 3, or 4, 48" or 2 or 4, 96", T12 Rapid Start Lamps.

BENJAMIN LEADER "CORRI-LITE"



Designed for lighting corridors, narrow rooms, offices and stores efficiently and economically. Its unusually styled, steel baffles add to the modern effect of the fixture and provide correct shielding. For individual or continuous line. (COR-2172 and COR-2196 listed at right are two units in line.)

Slimline Units for 110-125 V., 60 Cycle Operation

Cat. No.	Lamps	Length	Width	Depth
COR-148	1-48"-Slim	48⅛"	6⅞"	7⅞"
COR-172	1-72"-Slim	72⅛"	6⅞"	7⅞"
COR-196	1-96"-Slim	96⅛"	6⅞"	7⅞"
COR-2172	2-72"-Slim	144⅛"	6⅞"	7⅞"
COR-2196	2-96"-Slim	192⅛"	6⅞"	7⅞"

Canopy suspension stems available. Also available for 1 (inline), 48" or 96", T12 Rapid Start Lamps.

BENJAMIN "TWIN-FLO & TRIPLE-FLO" PORCELAIN ENAMEL STEEL REFLECTORS

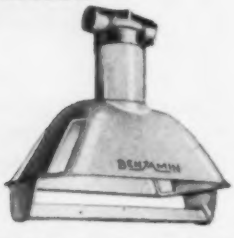


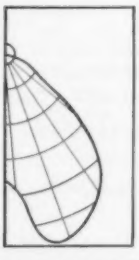
For excellent general lighting for vocational rooms, laboratories, manual training rooms, etc. available with solid or apertured reflectors. Apertured reflectors direct a portion of the light upward for greater seeing comfort (see curve at left). Reflectors are finished with top quality "Life-Time" Porcelain Enamel inside and out for better appearance and easier maintenance. 85% reflection factor gives you more light.

Length Overall	SOLID TOP 2 Lamps Cat. No.	SOLID TOP 3 Lamps Cat. No.	APERTURED TOP 2 Lamps Cat. No.	APERTURED TOP 3 Lamps Cat. No.
4'-3"	40162RS			
4'-3"	40362RS	40163RS	44362RS	44163RS
8'-6"	40362RS-8	40163RS-8	44362RS-8	44163RS-8
12'-9"	40362RS-12	40163RS-12	44362RS-12	44163RS-12
17'-0"	40362RS-16	40163RS-16	44362RS-16	44163RS-16
21'-3"	40362RS-20	40163RS-20	44362RS-20	44163RS-20

Units listed are for 48" Rapid Start Lamps. Also available for standard 40-W. lamps, with choice of Standard or Non-Blinking Starter.

BENJAMIN "STOCK-BIN-LITE" REFLECTOR





The ideal lighting unit for the lighting of shelves and bins in libraries, storerooms, book stacks, aisles, etc. The unique reflector construction makes possible three kinds of illumination required in such locations: (1) apertures light up areas between units and prevent glare when looking down an aisle; (2) V-shaped reflector bar directs light to top shelves; (3) porcelain enameled steel reflector directs illumination downward to shelves and bins near the floor. Available in 4 easy-to-wire hood styles to meet all installation requirements.

Catalog No.	Size of Lamp Wtr.	Dimensions—in. Width	Depth	Height
PENDENT HOOD UNITS				
E-1875	50-75	11⅜	7⅛	9⅝
E-1876	100	11⅜	7⅛	11⅝
E-1877	150	11⅜	7⅛	11⅝
FEED THRU HOOD UNITS				
T-1875	50-75	11⅜	7⅛	9⅝
T-1876	100	11⅜	7⅛	11⅝
T-1877	150	11⅜	7⅛	11⅝

Pendent hoods tapped ½" standard, ¾" when specified. Feed Thru Hoods tapped ½" only.

FLOODLIGHTING for SPORTS AREAS

HUNDREDS OF SCHOOLS throughout the country have found the answers to their problems of stimulating attendance and increasing revenue from football in Benjamin floodlighting for night games.

Night football, just like softball and other floodlighted night sports, is assured of a greater following because it takes advantage of most people's leisure time and offers them entertainment at a time when they are free and seeking it.



Illumination for the football field of Loyola University in New Orleans, Louisiana, is provided by Benjamin "Play-Area" floodlights using 1500 watt lamps



An installation of Benjamin Aluminum floodlights using 1500 watt lamps at Bowman Gray Memorial Stadium, Winston-Salem, North Carolina



"SENIOR PLAY-AREA"
For 750-1500 watt lamps

"ELLIPTO-LITE PLAY-AREA"
For 300-500, 750-1500 watt lamps

New Aluminum "Olympia" Floodlight for 750-1500 watt lamps

Easy relamping and maintenance are features of "Olympia" design

OPEN-TYPE, PORCELAIN ENAMELED FLOODLIGHTS

Benjamin "Senior Play-Area" Floodlights meet every requirement of football lighting by providing exceptionally high intensity illumination forward and toward the sides of the floodlighting unit. They combine in one unit a large open-type porcelain enameled steel reflector with an inner auxiliary reflector of processed oxidized aluminum which assists in building up illumination over distant areas.

Benjamin "Ellipto-Lite Play-Area" Floodlights are similar in general construction to "Senior Play-Area" Floodlights, but are provided with a slightly smaller porcelain enameled steel reflector. In light output they compare favorably with the "Senior Play-Area" Floodlights.

NEW "OLYMPIA" ENCLOSED-TYPE, ALUMINUM FLOODLIGHTS

This line of weatherproof, aluminum floodlights is designed primarily for sports lighting, but is equally suitable for general floodlighting. They are available with narrow, medium or wide beam spreads.

Non-Ferrous, Weatherproof Construction—All exposed metal parts are aluminum or other non-ferrous material except for the steel trunnion bracket. This construction reduces the tendency of movable parts to "freeze" and prevents rust streaks on the reflection surfaces. Heat and impact resisting glass is "spun" into the reflector as permanent protection for the lamp against rain, dirt and insects.

Detachable Hood for Quick, Safe Maintenance—Floodlight hood, socket, lamp and wiring are removed, as a one-piece assembly, by simply loosening two wing nuts. The reflector can be swung up and back for cleaning, then returned to the original position without special adjustment.

Quick, Accurate Positioning—Convenient degree scales are provided for horizontal and vertical adjustment. Floodlights are quickly aimed by means of a removable sighting tube and lock in position by a large, hand-operated, wing nut on each trunnion arm.

CURTIS LIGHTING, INC.

Dept. AS-4, 6135 W. 65th Street, Chicago 38, Illinois

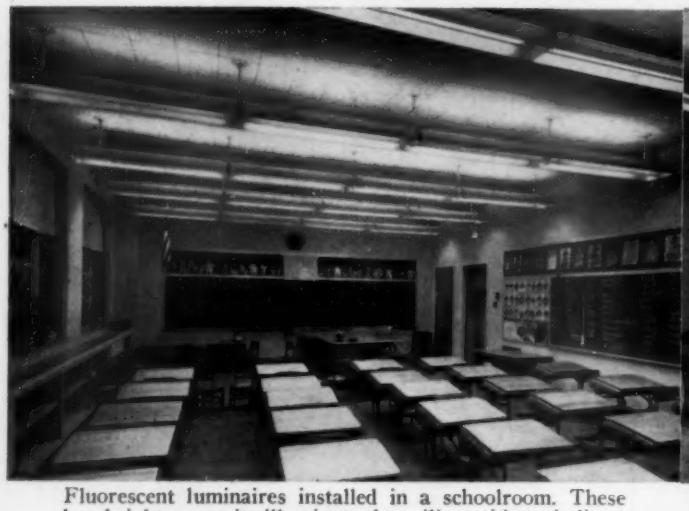
LIGHT FOR EVERY SCHOOL REQUIREMENT

NEW YORK
TORONTO, CANADA

CURTIS
LIGHTING, INC.

6135 W. 65 STREET
CHICAGO 38, ILLINOIS

Curtis "Forty-Sixty"



Fluorescent luminaires installed in a schoolroom. These low-brightness units illuminate the ceiling with an indirect component of approximately 40% of the light output of the luminaire. The 60% direct component is louvered to provide adequate shielding. These efficient units attain high levels of quality illumination without annoying glare.



This music room required general overall illumination as well as high level quality lighting at the music stand level. The Curtis "Forty-Sixty" luminaire provides illumination on the ceiling to relieve brightness contrast and also provides necessary light on the working plane. Write for Curtis Bulletin No. 2400.



The illustrations above show the newest concept in school lighting. This exclusive Curtis "Light and Sound Conditioning System" provides recommended levels of low-brightness illumination plus effective acoustical treatment at low initial cost, low installation cost and low maintenance cost. The Curtis system is recommended for classrooms, school offices and auditoriums and will accommodate all room sizes. Write for Bulletin No. 2418.



This library shows the result of Curtis Appropriate Brightness Control lighting by use of Eye-Comfort Troffers. Curtis troffers are direct type luminaires with 94% of the light output in the down zone which makes them ideal for the many school areas where proper amounts of high quality light are so necessary for comfortable seeing conditions. Write for troffer Bulletins.

CURTIS LIGHTING, INC.

QUALITY SCHOOL LIGHTING SINCE 1897

THERE IS A CURTIS REPRESENTATIVE NEAR YOU TO SOLVE ANY LIGHTING PROBLEMS

CURTIS LIGHTING, INC.

6135 W. 65 STREET
CHICAGO 38, ILLINOIS

In every phase of school lighting, whether it be the classroom, auditorium, gymnasium, principal's office or school corridor, Curtis luminaires can be depended upon to provide quality illumination. There is a Curtis luminaire designed to fit your specific requirements. For more than half a century Curtis luminaires have been installed in schools of all types throughout the country. The Curtis roster of school lighting installations includes some of the largest universities and colleges in the country as well as many schools in small rural districts. To solve your lighting problems, write for the name of your nearest Curtis representative. No cost or obligation.



Curtis "Sno-Flake" illustrated above is shown in a typical classroom installation. It presents an entirely new concept in design for indirect incandescent illumination. Write for Bulletin No. 2407.





These excellent gymnasium lighting installations utilize the famous Curtis "X-Ray Reflector." Scientifically designed with outer reflector surface of pure silver protected by "Golden Armor." The Golden Armor is a special patented process developed in the Curtis Research Laboratories to keep the pure silver reflector surface always at original efficiency. These units are available for either recessing or pendent mounting. Write for Bulletin No. 2409.

HOLOPHANE COMPANY, INC.
342 Madison Avenue, New York 17, N. Y.

PARADOME...5400

GREATEST
ACHIEVEMENT
IN 57 YEARS OF
EDUCATIONAL
LIGHTING



S-5400

C-5400

Many of the new techniques that have marked the latest advances in educational lighting have been pioneered by Holophane research . . . Now HOLOPHANE No. 5400 represents another important step forward . . . It is, beyond question, the finest semi-direct lighting unit ever designed for educational use! Its unique prismatic control concentrates maximum illumination on the working areas with the best visual comfort and lowest brightness. Attractive in design, it conforms with modern interiors. It is particularly suitable for the new low-ceiling classrooms—as well as many other areas in today's educational structures . . .

Write for complete data on No. 5400—as well as other literature by Holophane, recognized lighting authorities in the educational field.

For Better Lighting . . . Specify

HOLOPHANE · VISIBILITY WITH COMFORT ·

HOLOPHANE COMPANY, INC.

THERE IS A HOLOPHANE LIGHTING UNIT FOR EVERY SCHOOL LIGHTING NEED



Classrooms (Fluorescent)

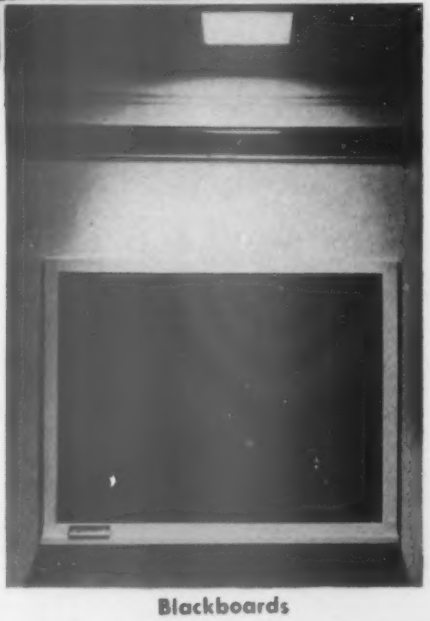


Classrooms (Incandescent)

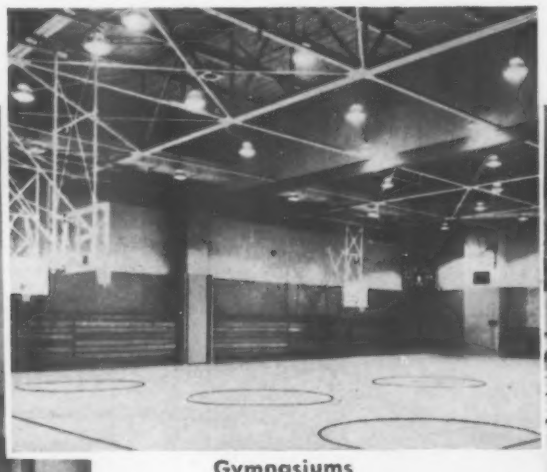
HOLOPHANE Planned LIGHTING

For Every Scholastic Activity

Holophane has the experience and the know-how to provide the best in illumination for every scholastic activity. Better lighting means better vision, greater safety and increased efficiency for both pupils and teachers. Holophane has engineered a specific unit for each work or play area in the modern school or college . . . The Holophane Engineering Staff invites consultation, without obligation, regarding any school lighting plan.



Blackboards



Gymnasiums



Swimming Pools



Corridors

HOLOPHANE COMPANY, INC.

Lighting Authorities Since 1898 · 342 MADISON AVENUE, NEW YORK 17, N.Y.

THE HOLOPHANE COMPANY, LTD., THE QUEENSWAY, TORONTO 14, ONTARIO

THE EDWIN F. GUTH COMPANY

2615 Washington Ave., St. Louis, Mo.

Guth

THE REALLY COMPLETE LINE OF BOTH FLUORESCENTS AND INCANDESCENTS!

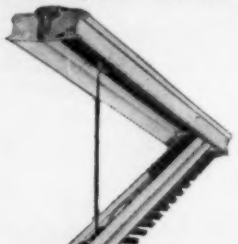
—featuring the newest advancements in lighting:

- GRATELITE*—exclusive 3/8" cubes provide 45° x 45° shielding for sight-saving diffusion
- *Telescopic Channel*—5-ft. package to accommodate 8-ft. units
- *Rolled Channels*—for rigidity and precision
- *Completely Assembled Fixtures*—factory tested

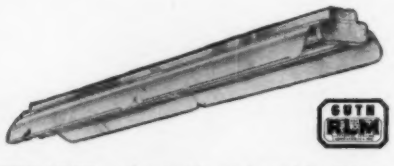
When you specify GUTH Luminaires you get the benefit of more than a half-century's experience in pioneering better lighting. We make good specialized equipment for every lighting need—all *precision-planned* for economical installation and maintenance:

FLUORESCENT: Commercial and Industrial; Glass diffused, Eggcrate shielded, totally indirect, luminous indirect, recessed troffers and exposed lamp types.

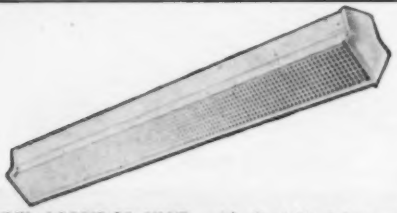
INCANDESCENT: Commercial and Industrial; Indirect, direct and semi-indirect types; also high bay reflectors, exit and utility lighting units.



GUTHLITE®—the revolutionary "Jacknife" Hinge Luminaire that swings down for easy relamping or cleaning right from the floor! For 2 40- or 2 85-watt or 2 4-ft. SLIMLINE lamps; ceiling or suspension, unit or continuous mounting. Simplest fixture to install. Bulletin 845-X.



WYTE-LINER—white inside and outside, 7% Uplite component (takes gloom off ceiling). AIR-FLOW channel for longer ballast life. Reflectors 300° Permalux or Porcelain Enamel. Made in 2 and 3 40-watt, 2 85-watt, and 4- and 8-ft. SLIMLINE lamps. Easy to install and clean. Catalog 48-X.



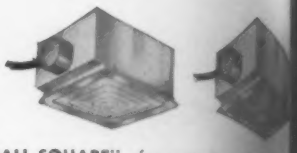
"V" CORRIDOR UNIT—with GrateLite* Louver-Diffuser. Fills wide hallways and corridors with practical, wall-to-wall light. Lamps shielded by easily maintained GrateLite. Models: 4' & 8' for 1 or 2 lamps. Bulletin 906-X.

*U.S. & Can. Pats. Pend. TM. Reg.

**TM Pats. Pend.



"LITE-BLOX" RECESSED TROFFERS—for 1, 2, 3 or 4 lamps: 20-, 40-, 85-watt, or 4-ft., 6-ft., or 8-ft. SLIMLINE. Exclusive end KO's provide exact 48.0"; modular design for unlimited patterns. Wide variety of shielding and diffusing glass panels available; also ALZAK Paraflector Louver. Catalog 50-X.



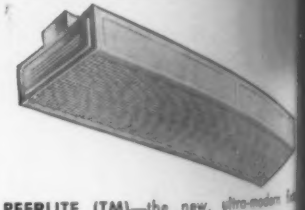
"ALL-SQUARE"—for recessing. One-piece cast frame. Light-leakproof. Wide-spread concentrating lens—sizes 6½" sq., 9" sq., 12" sq. PRE-WIRED. Removable top and hinge bottom for servicing from above or below. Catalog 49-X.



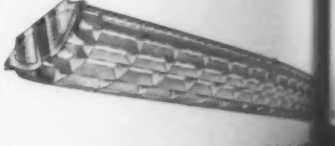
SEELUX®—totally indirect open bottom luminaire for Silver Bowl Lamps, with ALZAK concentric louvers; for stem suspension or close mounting. Bulletin 864-X.



LUMINOUS COVE—the 2-in-1 bracket, for 80% of light directly upward and outward, downward to side walls. Mounted "upside down" it solves dozens of tricky lighting problems. Perfect shielding in 45° x 90° zones. GrateLite*. Write for Bulletin 929-X.



PEERLITE (TM)—the new, ultra-modern [illegible] offering great flexibility. Forms any pattern: T, H, □, +, I. 20% uplight. Top plates adjustable for 100% downlight. For 2, 3 or 4 lamps, 4' or 8' long. Supplied with any type of louver or glass diffuser you wish. (Shown with GrateLite* Louver-Diffuser.) Bulletin 911-X.



TRUCOLITE*—versatile, highly efficient, [illegible] rect type; can be used open, with louvers or diffusing glass bottom. For 2, 3 or 4 40-watt lamps—also 2 and 4 4-ft. or SLIMLINE lamps. Ceiling or suspension, continuous mounting. Bulletins 814-X and [illegible]

THE THOMPSON ELECTRIC COMPANY

1111 POWER AVENUE, CLEVELAND 14, OHIO, U. S. A.

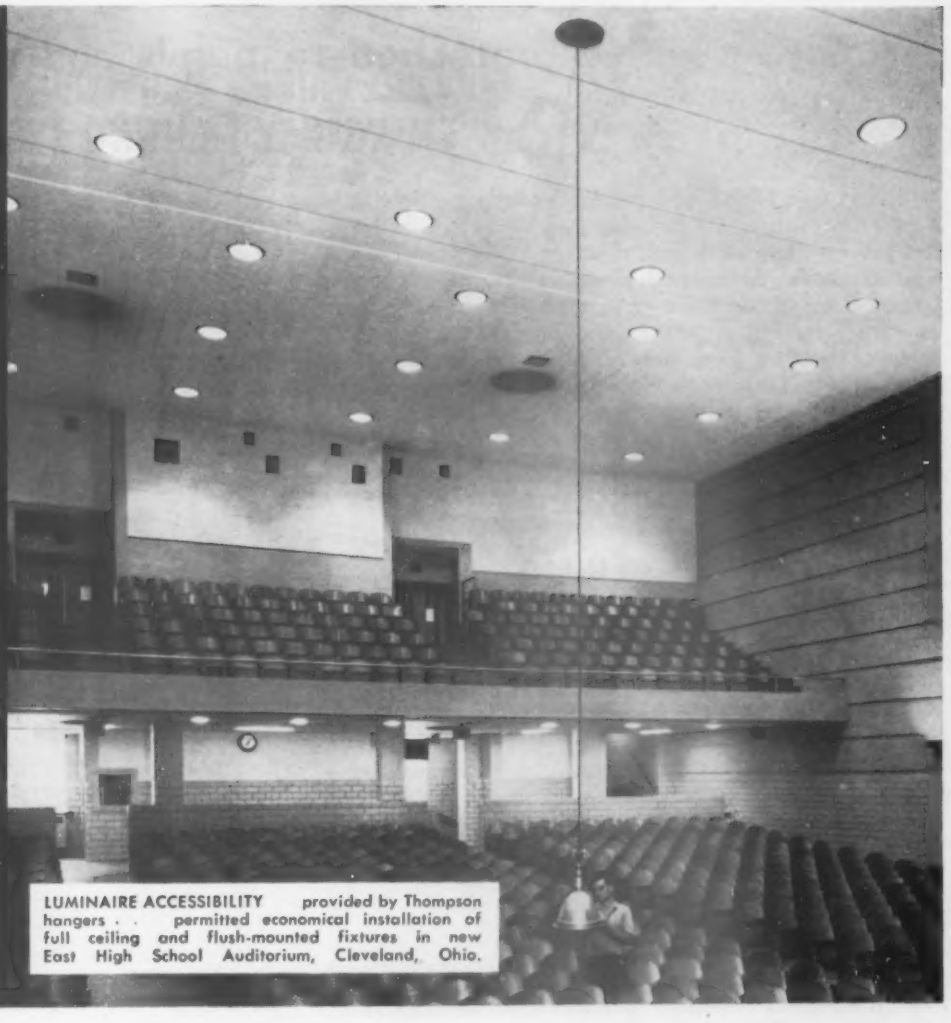
unlimited versatility in

OVERHEAD LIGHTING

with

THOMPSON

DISCONNECTING AND LOWERING HANGERS



LUMINAIRE ACCESSIBILITY provided by Thompson hangers . . permitted economical installation of full ceiling and flush-mounted fixtures in new East High School Auditorium, Cleveland, Ohio.

In this installation, fixed seats make the use of scaffolding for luminaire maintenance extremely difficult. Alternative of a catwalk system above the false ceiling would be costly and limiting to lighting layout. These problems were solved . . . at surprisingly low cost . . . by THOMPSON hangers. They reduced initial construction costs by eliminating the need for multiple catwalks . . . provided a safe, practical, economical means of cleaning or relamping luminaires quickly and easily *whenever necessary.*

Foolproof and easy to operate, THOMPSON disconnecting and lowering hangers are the only units that permit floor-level servicing of high-bay lights. They also facilitate a planned low-cost luminaire cleaning program to assure peak lighting efficiency at all times.



FOR ADDITIONAL DETAILS, WRITE FOR BULLETIN TH-52. Address inquiries to Educational Buildings Department.

SOLVE DESIGN AND LUMINAIRE MAINTENANCE PROBLEMS WITH ONE SPECIFICATION . . . *THOMPSON HANGERS*

EXIDE INDUSTRIAL DIVISION

The Electric Storage Battery Company
42 S. 15th St., Philadelphia 2, Pa.

Give positive protection to pupils and property with

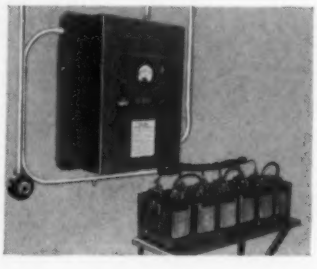
Exide® EMERGENCY LIGHTING SYSTEMS

THE CRITICAL NEED for dependable emergency lighting in many school areas must be recognized by those in authority and provided for *before* disaster strikes. When normal power goes off, sudden darkness can result in serious injuries caused by panic, loss of communications, damage to property. Exide emergency lighting protection guarantees instant, adequate lighting. Study the Exide answers to the problem given below—write to Exide for complete product information and specifications—call the Exide sales office listed.

THESE SPOTS require Exide emergency lighting protection:
Cafeterias • Auditoriums • Swimming Pools • Corridors • Exits • Locker Rooms • Aisles • Firetowers • Libraries • Lobbies • Stairways • Dispensaries • Boiler and Engine Rooms • Switchboard Rooms

THE EXIDE ANSWER:
Permanent Exide Emergency Lighting Systems

Modern schools now entirely eliminate the hazard of unexpected lighting failure by installing this Exide system, which automatically provides instant light from lamps on its own, permanently installed circuits. Long-life Exide batteries provide current for 32-volt, and 115-volt installations. Batteries are always fully charged, ready for instant use. Change-over from normal power to Exide emergency power is instant, automatic, completely reliable. The entire system is easy to install, makes use of regular wiring and electrical equipment. No special battery room is necessary. The Exide installation is compact, trouble-free, low in cost. Write for Form 4721.



Exide 32-volt system used when the load is less than 1200 watts, is compact and adaptable to small spaces.



This 115-volt Exide System, for lighting loads up to 10,350 watts, is typical of thousands assuring automatic, split-second lighting protection. Exide will help your architect or contractor include emergency lighting in your new or present building.

ANOTHER EXIDE ANSWER:
Exide Lightguard® Emergency Lighting Units

When lights go out, Exide Lightguards go on, instantly, automatically! These portable units can be used to supplement and extend the value of a built-in emergency lighting system. Mounted on wall brackets, they tie into any 115-volt outlet, eliminating extensive re-wiring. Older buildings can be modernized with these compact, new units. New buildings can also use Lightguards where running wires from a central system would be unnecessarily expensive.



The new Exide Model M has a manual two-rate charger and a convenient test switch.



Exide Model T is a simplified lower-cost unit with automatic high trickle rate charging.

THE NEW MODEL M Exide Lightguard (illustrated) has a two-rate charger—high rate and trickle. After the emergency use, the battery can be fully recharged quickly. This special Exide battery has been developed for the utmost in dependable operation and long life, with minimum maintenance. All units are UL-approved. Single and double lamp Lightguards are available; each lamp illuminates up to 10,000 sq. ft. Write for Forms 4808 and 4808A.

FOR LABORATORIES, FIRE ALARMS, PROGRAM CLOCKS, AUTO-CALL INTERIOR TELEPHONES, Exide batteries assure absolute dependability of vital electrical equipment, provide sustained high voltage, with low maintenance. Sealed glass or plastic type Exide batteries provide for experiments a *constant voltage* free from disturbance or interference by any outside influence.

For complete information, call your nearest Exide Sales Engineer

DALLAS 1, TEXAS	2133 McKinney Avenue
BOSTON 34, MASS.	100 Ashford Street
CHICAGO 9, ILL.	5335 S. Western Blvd.
CLEVELAND 14, OHIO	1014 Engineers Bldg.
DALLAS 1, TEXAS	2133 McKinney Avenue
DENVER 2, COLO.	810 14th Street
DETROIT 4, MICH.	8051 W. Chicago Blvd.
KANSAS CITY 23, MO.	129 Belmont Blvd.
LOS ANGELES 15, CALIF.	1043 S. Grand Avenue
MINNEAPOLIS 3, MINN.	1750 Hennepin Avenue
NEW ORLEANS 12, LA.	406 Civic Center Bldg.
NEW YORK 36, N. Y.	25 West 43rd Street
PHILADELPHIA 4, PA.	101 N. 33rd Street
PITTSBURGH 16, PA.	1608 Potomac Avenue
ST. LOUIS 3, MO.	1218 Olive Street
SAN FRANCISCO 24, CALIF.	6150 Third Street
SEATTLE 4, WASH.	1919 Smith Tower Bldg.
WASHINGTON 6, D. C.	1819 "L" Street, N.W.

GRAYBAR ELECTRIC COMPANY, INC.

Executive Offices: Graybar Building, New York 17, N. Y.

An all-inclusive electrical supply service for schools and universities

Through its nation-wide network of warehouses and offices, GRAYBAR distributes the products of more than 200 of the nation's leading manufacturers of electrical equipment and supplies. Its services are based on 84 years of experience in the electrical field.

Experienced GRAYBAR Representatives and equipment Specialists perform many useful functions for the school superintendent, school architect, the electrical contractor, and the buyer of electrical maintenance supplies—going far beyond mere "order-taking."



Aid in Electrical Planning

GRAYBAR is fully informed on modern equipment for school lighting, communication, signaling and alarm systems. Specialists familiar with school installations in many communities will advise on choice of equipment and planning of the system you desire.



Convenient Service

From a near-by GRAYBAR warehouse you can order a wide variety of electrical items – a fact that's particularly helpful in emergencies and often saves valuable time even on everyday requirements.

CONVENIENT LOCAL SERVICE
FROM OFFICES AND WAREHOUSES IN OVER 120 PRINCIPAL CITIES

Abilene, Texas
Akron, Ohio
Albany, N. Y.
Allentown, Pa.
Amarillo, Texas
Asheville, N. C.
Atlanta, Ga.
Austin, Texas
Baltimore, Md.
Baton Rouge, La.
Beaumont, Texas
*Binghampton, N. Y.
Birmingham, Ala.
Boise, Idaho
Boston, Mass.
Bristol, Tenn.
Buffalo, N. Y.
Butte, Mont.
*Charleston, W. Va.
Charlotte, N. C.
Chattanooga, Tenn.
Chicago, Ill.
Cincinnati, Ohio
Cleveland, Ohio
Clifton, N. J.
Columbia, S. C.
Columbus, Ohio
Corpus Christi, Texas
Dallas, Texas
Davenport, Iowa
Dayton, Ohio
Denver, Colo.
Des Moines, Iowa
Detroit, Mich.
Duluth, Minn.
Durham, N. C.
El Paso, Texas
*Erie, Pa.
Eugene, Ore.
Evansville, Ind.
Flint, Mich.
†Fort Lauderdale, Fla.
Forth Worth, Texas
Fresno, Calif.
Grand Rapids, Mich.
Green Bay, Wisc.
†Greenville, S. C.
Hammond, Ind.
Harrisburg, Pa.
Hartford, Conn.
Houston, Texas
Indianapolis, Ind.
Jackson, Miss.
Jacksonville, Fla.
Kansas City, Mo.
Knoxville, Tenn.
Lake Charles, La.
Lansing, Mich.
Little Rock, Ark.
Long Beach, Calif.
Los Angeles, Calif.
Louisville, Ky.
*Lubbock, Texas
Madison, Wisc.
Manchester, N. H.
Memphis, Tenn.
Miami, Fla.
Milwaukee, Wisc.
Minneapolis, Minn.
Mobile, Ala.
Nashville, Tenn.
Newark, N. J.
New Brunswick, N. J.
New Haven, Conn.
New Orleans, La.
New York, N. Y.
Norfolk, Va.
Oakland, Calif.
Oklahoma City, Okla.
Omaha, Nebr.
Orlando, Fla.
Peoria, Ill.
Philadelphia, Pa.
Phoenix, Ariz.
Pittsburgh, Pa.
Portland, Me.
Portland, Ore.
Portsmouth, Ohio
Providence, R. I.
Reading, Pa.
Richmond, Va.
Roanoke, Va.
Rochester, N. Y.
Rocky Mount, N. C.
Sacramento, Calif.
St. Louis, Mo.
St. Paul, Minn.
†St. Petersburg, Fla.
St. Lake City, Utah
San Antonio, Texas
San Bernardino, Calif.
San Diego, Calif.
San Francisco, Calif.
†Santa Ana, Calif.
Savannah, Ga.
Seattle, Wash.
Shreveport, La.
Sioux City, Iowa
Sioux Falls, N. D.
Spokane, Wash.
Springfield, Ill.
Springfield, Mass.
Springfield, Mo.
Syracuse, N. Y.
Tacoma, Wash.
Tampa, Fla.
Toledo, Ohio
Tulsa, Okla.
Washington, D. C.
Wichita, Kan.
Wilmington, Del.
Winston-Salem, N. C.
Worcester, Mass.
Youngstown, Ohio

*Sales office only †Sub-branch

Call Graybar first for...

- ALARM SYSTEMS
- ANNUNCIATORS
- APPLIANCES
- BATTERIES
- BELLS
- BUZZERS
- CABLE
- CALL SYSTEMS
- CIRCUIT BREAKERS
- CLOCKS
- COMMUNICATION
- CONDUIT
- CONTROLLERS
- CORDS
- DRY CELLS
- FANS
- FITTINGS
- FIXTURES
- FLOODLIGHTS
- FLUORESCENTS
- FUSES
- HORNS
- INSTRUMENTS
- INTER-PHONES
- JUNCTION BOXES
- LAMPS
- LUMINAIRES
- METERS
- MOTORS
- PLUGS
- PANELBOARDS
- OUTLETS
- RANGES
- RECEPTACLES
- RECTIFIERS
- REFLECTORS
- SIGHTMETERS
- SIGNALING
- SIRENS
- SOCKETS
- SOUND SYSTEMS
- STREET LIGHTS
- SWITCHES
- TAPE
- TELEPHONES
- TESTERS
- TRANSFORMERS
- TOOLS
- VOLTMETERS
- WIRE



MONTGOMERY MANUFACTURING CO.

Owensville, Indiana

Montgomery

SYNCHRONOUS

PROGRAM CLOCKS

- **Eliminate undependable manual systems, free school executives from unnecessary button pushing.**
- **Fully automatic. Easily set to any class schedule. Pushbuttons provide for special signals.**
- **Models for either 12 or 24 hour operation. Calendar switch silences signals during any desired days or nights. Setting easily changed when required.**

Newly Improved Models Have Greater Accuracy, Increased Flexibility — Meet Practically Any Classroom Need

Montgomery Program Clocks have always been characterized by their accuracy, long life, and freedom from trouble. Recent changes in the operating mechanism have increased these desirable qualities to a marked degree.

Specifically, contact operation and signal duration have been still further refined and improved. Constant research and experiment have brought about the use of even better materials and more precise workmanship.

In addition, all two-circuit (Model L) Montgomery Program Clocks are now provided with two-circuit calendar switches which provide automatic control for alternate schedules.

Turning the clock hands sets the program mechanism automatically, assuring perfect synchronization; resetting the clock does not disturb pre-set schedules; the flick of a switch gives you manual operation when needed.



MONTGOMERY PROGRAM CLOCKS ASSURE PUNCTUALITY AT LOW COST

Montgomery Program Clocks are available in four models to meet practically every classroom need.

The case is attractive, made of enduring formed steel and finished in gray metalescent baked enamel which blends with any decorative scheme.

Shipping weight of all models is approximately 12 lbs. Express shipment is recommended.

Complete line of bells, buzzers and accessories available.

Model M-12, single circuit. Operates day hours only on a 12-hr. schedule; rings bells at any multiple of 2½ minutes. Price $89.50

Model M-24, single circuit. For 24-hr. service, day or night schedules; rings bells at any multiple of 5 minutes. Price $89.50

Model L-12, two circuits. Day hours only, 12-hr. schedule. Operates two separate groups of signals independently at 2½-min. multiples. Price $119.50

Model L-24, two circuits. Day or night, 24-hr. schedule. Operates two groups of signals at 5-min. multiples. Price $119.50

WRITE FOR DETAILED INFORMATION—OR SEE YOUR SCHOOL SUPPLY DEALER

IBM
TRADE MARK

INTERNATIONAL BUSINESS MACHINES CORPORATION
590 MADISON AVENUE, NEW YORK 22, N. Y.

ELECTRONIC and ELECTRIC TIME and PROGRAM SIGNALING CONTROL SYSTEMS

IBM ELECTRONIC and ELECTRIC SELF-REGULATING TIME and SIGNALING SYSTEMS are designed to maintain accurate and uniform time in all clocks, time signals, and time recorders. The master control is the "director" of each system, supervising all time units and automatically correcting those units which, when temporary power outages occur, do not agree with the master. The three types of IBM self-regulating time and program signaling systems are:

THE ELECTRONIC SYSTEM operates over regular AC lighting wires. *No special wiring* is required to control and automatically correct, if necessary, time and signaling units in this system. Uniform time is maintained in all clocks, time signals and time recorders by the automatic transmission of high frequency pulses superimposed on the lighting wires.

THE SYNCHRONOUS, WIRED SYSTEM operates on regular AC lighting wires. Automatic correction of units at variance with the master's time is accomplished through a separate circuit of wires connecting the master control and secondary units. As in the electronic system, uniform time is maintained automatically in all time units in this system.

THE MINUTE IMPULSE, WIRED SYSTEM is designed for operation and automatic regulation of all clocks, signals, and time recorders over circuits of control wires connecting the master and secondary units. Uniform time is maintained automatically to the minute in all secondary units by transmission of impulses over the control wires.



RADIO-SUPERVISED MASTER CLOCK



MASTER TIME and PROGRAM CONTROLS



BELLS



WALL CLOCKS



MODERN SQUARE CLOCKS



DOUBLE DIAL CLOCKS

TOWER CLOCKS, OUTDOOR CLOCKS, INTERIOR CLOCKS

IBM CLOCKS are manufactured in a variety of types and sizes . . . from tower clocks to standard and specially designed indoor and outdoor clocks. These clocks serve not only as basic time-pieces, but also as distinctive complements to buildings' architecture.

To assure their consistently dependable operation, these clocks are operated from IBM self-regulating master time controls. AC or DC operation is optional.

In addition to complete tower clocks, IBM manufactures movements and dial works of fine quality workmanship which may be installed as components of clocks planned for new installation or modernization of existing installations.

DIRECT READ TIME FLASHERS similar to that shown at the right are "landmarks of time" on many office and industrial buildings. IBM will provide flasher banks, relays, and all necessary time controls for this type of installation.



DIRECT READ FLASHER CLOCKS



LANDMARK CLOCKS



SKELETON DIAL EXECUTIVE CLOCKS

ATHLETIC SCOREBOARDS AND TIMING EQUIPMENT

IBM ELECTRIC SCOREBOARDS provide fast, accurate means of indicating the official time, score, and other pertinent facts of games. In addition to two standard basketball scoreboards, IBM builds to order complete indoor arena scoreboards for basketball, boxing, wrestling, track, hockey, and rodeo. IBM also will furnish components, such as numeral flasher banks, dial-type and direct-read timers, sideline and pressbox controls, bulls-eyes, and clock movements and dial works for all types of scoreboards including football and baseball boards to be constructed locally.

In addition, IBM will furnish necessary wiring diagrams and installation diagrams so that complete scoreboards can be designed in cooperation with local sign companies or maintenance staffs.



PRESSBOX CONTROLS



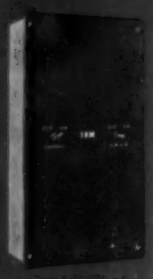
DIAL TYPE TIMER MOVEMENTS



BASKETBALL SCOREBOARDS



CENTRAL OPERATIONS PANEL



ELECTRONIC CODED RELAYS



PROGRAM MACHINES

CENTRAL CONTROL SYSTEMS

IBM CENTRAL CONTROL SYSTEMS provide a simple, efficient means of actuating many ON-OFF operations automatically . . . by electronics . . . without special control wiring. Centralized control will save much of the time, effort and resources necessary to your building's operation. Fuel, water, and electricity are used only as needed. On a pre-programmed schedule or manually from the central operations panel, the system will supervise lighting, heating, ventilating and other electrical switching functions. It also will supervise IBM clocks and audible signals to provide accurate, uniform time and program signaling.

This system is simple in character and involves only a few basic elements. CENTRAL OPERATIONS PANEL, TRANSMITTER, and CODED RELAYS are its major components. Existing IBM Electronic Time and Program Systems furnish the means for easy addition of central control without the need for special control wiring.



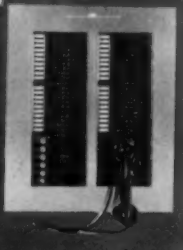
FIRE ALARM CONTROL CABINETS



FIRE ALARM SIGNAL STATIONS



TELEPHONES



TELEPHONE CONTROL PANELS

FIRE ALARM AND TELEPHONE SYSTEMS

IBM FIRE ALARM EQUIPMENT consists of alarm control cabinets, stations and signals for the following types of fire alarm systems:

MASTER CODE, CLOSED-CIRCUIT, single or double-supervised, 1-4 signal circuits.

MASTER CODE, OPEN-CIRCUIT, non-supervised.

NON-CODE, CONTINUOUS-RINGING, closed-circuit, single-supervised 1 or 2 signal circuits.

SELECTIVE CODE, CLOSED-CIRCUIT, single or double-supervised and 1-4 signal circuits.

SELECTIVE CODE, PRE-SIGNAL, closed-circuit, single or double-supervised and 1-4 signal circuits.

IBM INTERCOMMUNICATING TELEPHONE EQUIPMENT is designed to provide an efficient, centrally supervised, selective ringing, common talking telephone system. Various types of IBM telephone instruments, as well as control panels, target indicators, and power units are available.



FULLY-AUTOMATIC ATTENDANCE RECORDERS



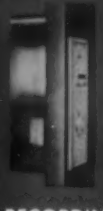
SEMI-AUTOMATIC TIME STAMPS



JOB COST RECORDERS



CONSECUTIVE SPACING RECORDERS



RECORDING DOOR LOCKS



FULLY-AUTOMATIC TIME STAMPS

TIME RECORDING EQUIPMENT

IBM TIME RECORDING EQUIPMENT consists of Attendance Time Recorders, Job Cost Recorders, Time Stamps, Consecutive Spacing Time Recorders and Recording Door Locks. Each unit is designed to perform a specific function . . . to provide accurate, indelible records of performance.

ATTENDANCE TIME RECORDERS are available for AC or Master Control operation. These machines record the IN and OUT time on individual cards of personnel. In addition to recording attendance time, fully-automatic recorders will control the sounding of time signals to indicate starting and stopping times and also will control a circuit of wall clocks for coordination of time indicated with the time recorded and signaled.

JOB COST RECORDERS are available for operation from AC or a Master Control. The purpose of these machines is to provide accurately-printed records of the time jobs or operations are started and finished. The elapsed time becomes the basis of true cost figures.

CONSECUTIVE SPACING TIME RECORDERS register attendance or job time, or both, on individual cards. Each registration is spaced automatically beneath the one preceding no matter how complex the schedule or how little time has elapsed between registrations. These machines also may be equipped with a time signal control. For operation from supervised AC or Master Control.

TIME STAMPS print the year, month, date, hour, and minute of receipt and dispatch of mail, correspondence, and documents. IBM manufactures three types: a fully-automatic, electric-print time stamp which changes from day to day and month to month automatically; a semi-automatic, electric-print stamp and a semi-automatic, manual-print stamp, which require a manual type-wheel change from month to month. AC or Master Control operation.

RECORDING DOOR LOCKS provide accurately-printed records of the time doors of valuable documents, plans, stores, and others are locked and unlocked, from inside or outside, and by whom. A tape record is available immediately by unlocking and removing the mechanism's case. AC operation only.

Interlocking door and window bolts may be added to the door lock control for a completely supervised protective system.

ELECTRIC TYPEWRITERS

THE NEW IBM ELECTRIC TYPEWRITER combines all the work-saving features and improvements that only IBM's 22 full years of continuous electric typewriter leadership and research could produce. The new IBM has an exclusive cushion-quiet carriage return for quieter operation, a swift gliding carriage for faster, easier typing, and many other new and years-ahead features. The Standard IBM is a superior teaching instrument for schools because students become more proficient typists in shorter time. Many schools from coast to coast have proven in actual classroom experiments that the IBM is "The Teaching Typewriter."

THE NEW IBM EXECUTIVE ELECTRIC TYPEWRITER, with its unique proportional spacing principle, writes letters of unsurpassed beauty. And schools use the Executive model to prepare masters for reproduction. By using the 2 and 3 unit space bars and typing twice, a typist can make even right margins for yearbooks, bulletins and other school publications.

Both the Standard and Executive models are available at special educational prices when used for instructional purposes in the school.

*Trade Mark



ELECTRIC TYPEWRITERS



EXECUTIVE* ELECTRIC TYPEWRITERS

DATA PROCESSING

The need for increased mechanization of data processing has long been recognized by those concerned with this area of business, science, engineering, education, and government. Increasingly, IBM machines and systems are providing operating efficiency while reducing time and costs. Flexibility, speed and accuracy are all prime advantages to the user. With a full, versatile line of electronic and electric equipment, IBM continues pioneering in this challenging field of data processing.

IBM CARDATYPE gives the growing school the opportunity to process class lists, grade reports, and post permanent records as well as handle payroll, accounts payable, and inventory accounting problems with the same accuracy and flexibility inherent in larger punched card machine installations.

IBM PUNCHED CARD ACCOUNTING MACHINES give institutional and business management a broad or detailed, current picture of any phase of operations. These machines, many of them embodying the latest principles of electronics, bring tremendous speed to the preparation of payrolls, inventory records, cost analysis, registration, administration, and statistical accounting, as well as to other accounting, statistical, and computing activities.

THE IBM ELECTRIC TEST SCORING MACHINE provides an accurate means of scoring and analyzing objective examinations. Multiple-choice, matching, true-false, likert-scale, agree-disagree, and weighted item tests—all can be scored at the speed of 800-900 tests an hour regardless of whether there are 10 or 150 questions. This time-conserving machine permits a wide expansion of school testing programs.

Special analyses can be obtained through the use of two attachments: the Aggregate Weighting Unit, which computes weighted averages, and the Graphic Item Counter, which counts the number of pupils who answered each question correctly or incorrectly.



CARDATYPES



ACCOUNTING MACHINES



TEST SCORING MACHINES

IBM

TRADE MARK

Branch Offices and Maintenance Locations

ALABAMA
Birmingham
Decatur
Gadsden
Mobile
Montgomery

ARIZONA
Phoenix
Tucson

ARKANSAS
El Dorado
Fort Smith
Little Rock

CALIFORNIA
Bakersfield
Fresno
Glendale
Long Beach
Los Angeles
Modesto
Oakland
Richmond
Riverside
Sacramento
Salinas
San Diego
San Francisco
San Jose
Santa Ana
Santa Barbara
Santa Monica
South Gate
Stockton

COLORADO
Colorado Springs
Denver

CONNECTICUT
Bridgeport
Hartford
New Haven
New London
Waterbury

DELAWARE
Seaford
Wilmington

DISTRICT OF COLUMBIA
Washington

FLORIDA
Gainesville
Jacksonville
Miami
Orlando
Pensacola
Tallahassee
Tampa

GEORGIA
Atlanta
Augusta
Columbus
Macon
Savannah

IDAHO
Boise
Pocatello

ILLINOIS
Aurora
Bloomington
Champaign
Chicago
Decatur
East St. Louis
Evanston
Galesburg
Moline
Peoria
Rockford
Springfield

INDIANA
Evansville
Fort Wayne
Hammond
Indianapolis
Lafayette
South Bend
Terre Haute

IOWA
Cedar Rapids
Des Moines
Dubuque
Sioux City
Waterloo

KANSAS
Topeka
Wichita

KENTUCKY
Lexington
Louisville

LOUISIANA
Baton Rouge
New Orleans
Shreveport

MAINE
Bangor
Portland

MARYLAND
Baltimore
Hagerstown

MASSACHUSETTS
Boston
Fitchburg
Framingham
Pittsfield
Salem
Springfield
Worcester

MICHIGAN
Ann Arbor
Battle Creek
Dearborn
Detroit
Flint
Grand Rapids
Jackson
Kalamazoo
Lansing
Muskegon Heights
Saginaw

MINNESOTA
Duluth
Minneapolis
St. Paul

MISSISSIPPI
Jackson
Meridian

MISSOURI
Columbia
Jefferson City
Joplin
Kansas City
St. Louis
St. Joseph
Springfield

MONTANA
Billings
Butte
Great Falls
Helena

NEBRASKA
Lincoln
North Platte
Omaha

NEVADA
Las Vegas
Reno

NEW HAMPSHIRE
Concord

NEW JERSEY
Camden
Elizabeth
Jersey City
Newark
Paterson
Trenton

NEW MEXICO
Albuquerque

NEW YORK
Albany
Bronx
Brooklyn
Buffalo
Elmira
Endicott
Garden City
Ithaca
Jamestown
New York City
Poughkeepsie
Queens
Rochester
Schenectady
Syracuse
Utica
Watertown
White Plains

NORTH CAROLINA
Asheville
Burlington
Charlotte
Durham
Greensboro
Raleigh
Winston-Salem

NORTH DAKOTA
Bismarck
Fargo

OHIO
Akron
Canton
Cincinnati
Cleveland
Columbus
Dayton
Findlay
Hamilton
Lima
Mansfield
Toledo
Youngstown
Zanesville

OKLAHOMA
Oklahoma City
Tulsa

OREGON
Eugene
Medford
Portland
Salem

PENNSYLVANIA
Bethlehem
Bradford
Chester
Erie
Harrisburg
Johnstown
Lancaster
Oil City
Philadelphia
Pittsburgh
Reading
Scranton
York

RHODE ISLAND
Providence

SOUTH CAROLINA
Charleston
Columbia
Greenville
Spartanburg

SOUTH DAKOTA
Pierre
Rapid City
Sioux Falls

TENNESSEE
Chattanooga
Kingsport
Knoxville
Memphis
Nashville

TEXAS
Amarillo
Austin
Beaumont
Corpus Christi
Dallas
El Paso
Fort Worth
Galveston
Harlingen
Houston
Lubbock
Midland
San Antonio
Tyler
Waco

UTAH
Ogden
Salt Lake City

VERMONT
Montpelier
Rutland

VIRGINIA
Norfolk
Richmond
Roanoke

WASHINGTON
Olympia
Richland
Seattle
Spokane
Tacoma

WEST VIRGINIA
Charleston
Huntington
Parkersburg
Wheeling

WISCONSIN
Green Bay
Madison
Milwaukee
Racine
Wausau

WYOMING
Casper
Cheyenne

INTERNATIONAL BUSINESS MACHINES CORPORATION

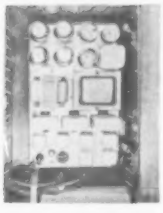
590 Madison Ave., New York 22, N.Y.

Simplex master clock and program systems

. . . your choice of 5 systems

electronic master system no. 1


Master Clock
Program Unit


Transmitter


Signals


Racks


Payroll Recorder


Racks


Secondary Clock


Cost Recorder

e electronic control and operation of clocks and ogram signals by means of a carrier current signal the same method used for many years by Public ities to operate remote relays, turn on and off eters and street lights.

The basic principle of this type of system is the perimposing of a high frequency signal on existing wer lines and providing units called receivers to pond to this signal.

The application of the principle to the Simplex ctronic clock system is straightforward and simple. nit called the transmitter is used to generate the h frequency signals, and these signals when accepted by a tuned receiver close a relay circuit which can be used to control clock correction, Program Bells, Lights, Heater Controls or other devices.

The Simplex master clock of the system is an elaborate "time switch" which periodically turns on the heaters and plate circuits of the tubes to operate the transmitter. This clock is built with provisions to keep it operating during a power failure and is capable of measuring the time the power has been off to a maximum of 24 hours.

The secondary clocks are equipped with dual motor movements and a receiver which will energize the high speed motors and de-energize the normal motors when a high frequency signal is present on the line.

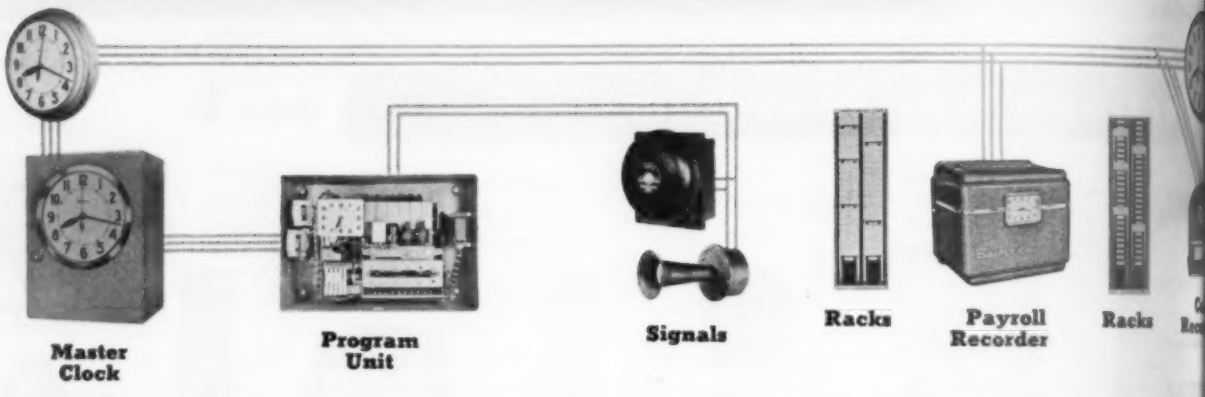
automatic 3 wire synchronous system no. 2

e Automatic 3 Wire Synchronous Master Clock is synchronous motor driven clock mechanism. This provides hourly correction to all secondary time ching clocks or recording units. This Simplex em utilizes the time proven features of dependable CHRONOUS motor drive in the secondary time ping and recording devices, and uses the Master k for ONE PURPOSE ONLY, namely; for the ly supervision and correction of secondary unit errors. At a given minute each hour, the Master k electrically compares the time accuracy of all ndary units and if any units are fast, those units hold up and wait for the others. If any units are slow, they are singled out and advanced 15 times normal speed until they again synchronize to the master clock time. The correction range is 15 minutes slow or 1 minute fast. The Master Clock is equipped with a device to provide continued operation for a minimum period of 24 hours in the event of power line failure. It can be equipped with an accumulator device which will measure the duration of any overall power failure to a maximum of 24 hours. Upon resumption of main line power, automatic correction of secondary units takes place.

other systems on page 2

A.I.A. file no. 31-i-2

3 wire impulse master clock system — no. 3



The Simplex 3 Wire Impulse Master Clock is a synchronous motor driven clock mechanism with electrical contact provisions for operating a 3 Wire system of automatic resetting and synchronizing of secondary clocks or recorders. This is the conventional minute-impulse type of Master Control wherein an electrical impulse is transmitted to a 3 Wire secondary clock circuit thus advancing all secondary units in unison. At a given minute each hour the Master Clock compares its time with the time of all secondary units; all secondary units fast will hold up, and all secon units slow will receive a series of fast impulses correct time is indicated. Correction range o Master Clock is 20 minutes fast or 20 minutes s This Master Clock can be equipped with a 24 accumulator device which will measure the dura of any overall power failure to a maximum o hours. Upon resumption of main line power, a matic correction of secondary units takes place.

2 wire impulse master clock system — no. 4

The Simplex 2 Wire Impulse Master Clock is a synchronous motor driven clock mechanism with electrical contact provisions for operating a 2 Wire system of automatic resetting and synchronizing of secondary clocks or recorders. This system is similar to System No. 3 except that it is a 2 wire instead of 3 wire system. It also has a dual voltage type control to provide the unlocking impulse following hourly rection. This Master Clock can be equipped wi 24 hour accumulator device which will measure duration of any overall power failure to a maxim of 24 hours. Upon resumption of main line po automatic correction of secondary units takes pl

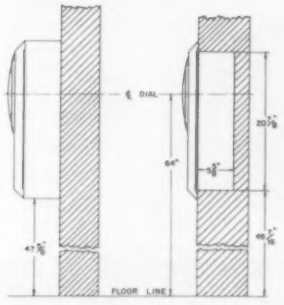
manual reset clock system — no. 5

For this type of system each clock on the system is equipped with a special movement. During operation the normal motor in each device operates the clocks at normal rate. When a power interruption occurs, all clocks stop. When the power returns, all clocks start again automatically, but they are slow to the extent of the interruption. To return to correct time, it is necessary to simply throw the reset switch of the control to the "advance" position with the switch provided, thereby supplying power to the resetting motor which operates to cause all clocks to operate at 15 times their normal rate. When clocks are again back to the correct time, as obser visually, the reset switch is thrown to the "norm position, thereby restoring the system to correct and normal operation. The entire clock system be de-energized at any time by throwing a switch the control to the stop or system-off position. A corrective system which also provides for synch nizing of individual clocks and sweep-second h by proper use of control unit.

Simplex master clock and program systems

aster clock and Program Unit · *surface or flush mount*





urface mount surface mount flush mount

Surface Mount			Flush Mount		
	Overall Width	Projection from Wall	Overall Height	Overall Width	Projection from Wall
	19½"	8⅛"	24¼"	19¼"	2½"

Model MP1W 73A Semi-flush design combination master control and program device. The Master Control unit is synchronous motor driven with standby and accumulator for 3 wire hourly corrective impulse system. The program device is provided with 2, 4 or 6 circuits which may be set at minute intervals and a 7 day calendar device for the automatic silencing of signals during unwanted periods.

Model MPIW 83A Same as above except surface design.

Model MPIW 72A Same as MPIW 73A except for 2 wire hourly corrective system.

del MPIW82A Same as above except surface gn.

del MPSE7 Semi-flush design combination master ol and program device. The master control unit nchronous motor driven with standby and aculator for electronic hourly corrective system. The gram device is provided with 4 electronic and one signal circuit which may be set at minute rals and a 7 day calendar device for the autoc nlencing of unwanted signals.

del MPSE8 Same as above except surface design.

del MPSW7 Semi-flush design combination Master ol and program device. The Master Control unit nchronous motor driven with standby and aculator for 3 wire synchronous hourly corrective system. The program device is provided with 2, 4 or 6 circuits which may be set at minute intervals and a 7 day calendar device for the automatic silencing of signals during unwanted periods.

Model MPSW8 Same as above except surface design.

Model MSM7 Flush design manual control station for group corrective manual system.

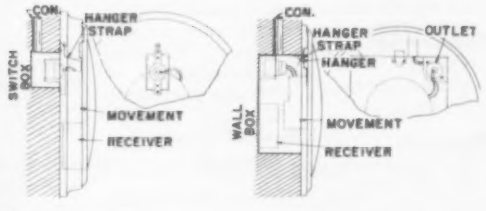
Model MSM8 Same as above except surface design.

Model PSM67 Surface design program device. Synchronous motor driven for 3 wire group corrective system. Provided with 2, 4 or 6 circuits which may be set at minute intervals and a 7 day calendar device for the automatic silencing of signals during unwanted periods.

Model PSM68 Same as above except surface design.

ondary clock · *surface or flush mount*





surface mount flush mount

Surface Mount			Flush Mount		
	Overall Diameter	Overall Depth	Dial Size	Overall Diameter	Overall Depth
	11 1/16"	3"	8"	10 3/16"	1 3/16"
	15¼"	3"	12"	14"	1 3/16"
	18 3/32"	3"	16"	17 1 3/32"	1 3/16"

RIW83A Secondary Clock, impulse drive hourly corrective 12" dial for 3 wire system. Surface or flush mount.

RSE8 Secondary Clock, synchronous motor drive, 12" dial for electronic hourly correction. Surface or flush.

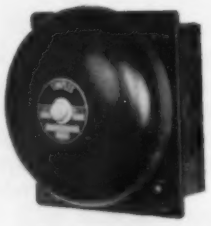
RSW8 Secondary Clock, synchronous motor drive 12" dial wired hourly correction. Surface or flush mount.

RSM8 Secondary Clock, synchronous motor drive 3 wire group correction 12" dial. Surface or flush mount.

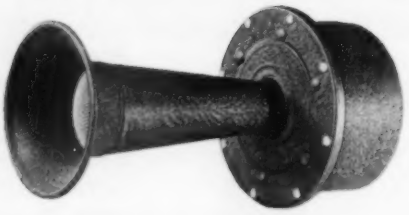
RIW82 Secondary Clock, impulse drive non-corrective straight 2 wire minute impulse 12" dial. Surface or flush mount.

Simplex master clock and program systems

signal equipment



Bell model 6B110A



Horn model 122 AW



Buzz model ZB-1

other Simplex time recording products

Simplex payroll recorder



Simplex payroll recorder

The Simplex Trigger-touch Payroll Recorder is fully automatic. It positions the card automatically for each payroll period. It prevents improper registrations such as "back side to" or "up side down." It provides a red tardy signal, in or out. Speeds up clock line. Makes for faster payroll make-up.

Simplex electric time stamp



Simplex electric time stamp

A must for regular mail handling. Also settles disputes about when work-in-progress forms are received and passed along. Every responsible department head and foreman welcomes its protection. Eliminates doubt, dispute, and delay. Automatically registers as contact is made with paper.

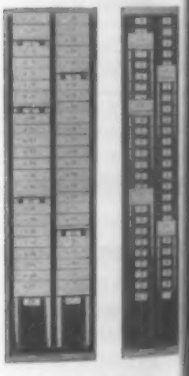
Simplex watchclocks



Simplex watchclocks

Provide positive proof that your watchmen made their rounds at the times shown. Sturdily built for rough usage. Tamper-proof. Your best protection against fire losses, burglaries and pilferage.

Simplex card racks



Simplex card racks

All-steel, extra card racks. For small segregated or remote groups of employees. Eliminate clock rush, work stoppages. Permit foremen to check absentees and rearrange production schedules.

Simplex branch sales and service offices ready to serve you

Alabama
Birmingham
Mobile

Arizona
Phoenix

Arkansas
Little Rock

California
Los Angeles
San Francisco

Colorado
Denver

Connecticut
Bridgeport
Hartford
New Haven

District of Columbia
Washington

Florida
Miami
Tampa
Jacksonville

Georgia
Atlanta

Idaho
Boise
Twin Falls
Idaho Falls

Illinois
Chicago
Peoria
Rock Island

Indiana
Indianapolis
South Bend

Iowa
Des Moines
Dubuque
Spencer
Waterloo

Kentucky
Louisville

Louisiana
Monroe
New Orleans
Shreveport

Maine
Portland

Maryland
Baltimore
Frostburg

Massachusetts
Boston
Fall River
Lawrence
Springfield
Worcester

Michigan
Detroit
Flint
Grand Rapids

Minnesota
Duluth
Minneapolis
St. Paul

Missouri
St. Louis
Kansas City

Nebraska
Grand Island
Omaha

New Jersey
Newark

New York
Albany
Brooklyn
Buffalo
Elmira
New York City
Rochester
Syracuse

No. Carolina
Winston-Salem

North Dakota
Bismarck
Fargo

Ohio
Akron
Cincinnati
Cleveland
Columbus
Toledo

Oklahoma
Oklahoma City

Oregon
Portland

Pennsylvania
Erie
Harrisburg
Philadelphia
Pittsburgh
Reading
Scranton

Rhode Island
Providence

So. Carolina
Columbia

Tennessee
Memphis

Texas
Corpus Christi
Dallas
Fort Worth
Houston
San Antonio

Utah
Salt Lake City

Virginia
Richmond

Washington
Seattle

West Virginia
Charleston

Wisconsin
Appleton
Milwaukee

Complete catalogs, data sheets, and typical specifications available from factory or Simplex branch offices.

SIMPLEX TIME RECORDER CO.

Home Office: Gardner, Mass. Factories: Gardner, Mass., U.S.A. and Port-of-Spain, Trinidad, B.W.I.

"time systems since 1888"

D INSTRUCTIONAL AND ADMINISTRATIVE

1. Audio Visual

American Optical Company	**D–1/AO**
Plastic Products, Incorporated	**D–1/Pl**
Radio Corporation of America	**D–1/RCA**
University Loudspeakers, Inc.	**D–1/Un**
Califone Corporation	D 7
David Bogen Company, Inc.	D 8, 9
DuKane Corporation	D 10, 11
Presto Recording Corporation	D 12
Everett Piano Company, Division of Meridan Corp.	D 13
The Baldwin Piano Company	D 14, 15

2. Auditorium—Stage

Century Lighting, Inc.	**D–2/Ce**
Novelty Scenic Studios, Inc.	**D–2/No**
Frank Adam Electric Co.	D 16, 17
Art Craft Theatre Equipment Co.	D 18
Automatic Devices Company	D 19
Capitol Stage Lighting Co., Inc.	D 20
Kliegl Bros.	D 21
General Lighting Company	D 22, 23
Knoxville Scenic Studios Incorporated	D 24
Pittsburgh Stage, Inc.	D 25
The Strong Electric Corporation	D 26
Ward Leonard Electric Company	D 27
I. Weiss and Sons	D 28, 29

3. Classroom

American Seating Company	**D–3/AmS**
The Bassick Company	**D–3/Ba**
The Brunswick-Balke-Collender Co.	**D–3/Br**
Educators Manufacturing Co.	**D–3/Ed**
Fiberesin Plastics Company	**D–3/Fi**
General Electric, Textolite	**D–3/GE**
Griggs Equipment Company	**D–3/Gr**
Ideal Seating Company	**D–3/Id**
Kuehne Manufacturing Company, School Furniture Division	**D–3/Ku**
Metwood Mfg. Co.	**D–3/Me**
National School Furniture Company	**D–3/NaS**
Shwayder Bros., Inc.	**D–3/Sh**
Toledo Metal Furniture Company, The	**D–3/To**
Virco Manufacturing Corporation	**D–3/Vi**
Vogel-Peterson Co.	**D–3/Vo**
Westmoreland Metal Mfg. Corp.	**D–3/We**
Grogg Bros. Mfg. Co.	D 30
Anderson-Hickey Company	D 31
Arlington Seating Company	D 32, 33
The Brewer-Titchener Corporation	D 34
Buckeye Glide Co., Inc.	D 35
Faultless Caster Corporation	D 36
Heywood-Wakefield Company, School Furniture Division	D 37
Howe Folding Furniture, Inc.	D 38
The Formica Company	D 39
Irwin Seating Company	D 40
Midwest Folding Products	D 41
General School Equipment Company	D 42
Norcor Manufacturing Company, Inc.	D 43
Mitchell Manufacturing Co.	D 44-46
E. W. A. Rowles Co.	D 47
School Interiors Co., Inc.	D 48
Seats & Desks, Inc.	D 49
Williams & Brower, Inc.	D 50

4. Book Binding Fabrics

The Holliston Mills, Inc.	D 61

5. Administrative Office

Art Metal Construction Co.	**D–5/Ar**
Federal Equipment Co., The	**D–5/Fe**
General Fireproofing Company	**D–5/Ge**
All-Steel Equipment Inc.	D 51
Diebold, Inc.	D 52, 53
The Globe-Wernicke Co.	D 54, 55
Remington Rand, Division of Sperry-Rand Corporation	D 56, 57
Underwood Corporation	D 58, 59
The National Cash Register Company	D 60
The School Executive	D 62





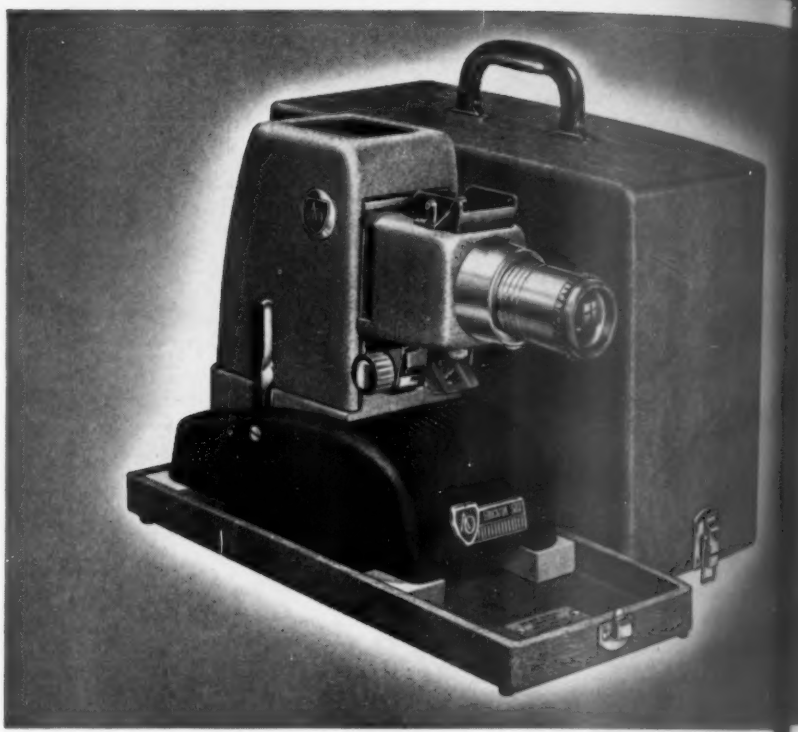


D-1/AO

THE COMPLETE LINE OF American Optical STILL PROJECTORS

FOR 2″ x 2″ SLIDES
AND FILMSTRIPS

AO EDUCATOR 500



In classrooms, auditoriums, churches, wherever there's a teaching job to do . . . the new AO Educator 500 provides the finest possible standard for 500 watt 2″ x 2″ slide and filmstrip projectors.

Even under unfavorable projection conditions, the famous AO optical system gives bright, clear picture results. This and the many other exclusive projector features make the new AO Educator 500 outstanding in its field.

Compare it with any other make. You'll *see* the difference.

MODELS

Cat. No.	
3824	Educator 500 with 5″ projection lens, filmstrip unit, 2″ x 2″ slide changer, and carrying case
3824A	Educator 500 with 3½″ projection lens, filmstrip unit, 2″ x 2″ slide changer, and carrying case
3824B	Educator 500 with 7″ projection lens, filmstrip unit, 2″ x 2″ slide changer, and carrying case

ACCESSORIES

Cat. No.	
C3934A	3½″ projection lens with adapter
C3862A	5″ projection lens with adapter
C3938A	7″ projection lens with adapter
4005	Extra 500 watt lamp

Maximum Screen Illumination . . .
even in an undarkened room . . . with the powerful 500 watt lamp. Brilliant uniform illumination provides clearer detail . . . insures attentive audience.

Sharp, Crisp Reproduction . . .
in color or black and white with coated projection lens (3½″, 5″ or 7″ focal length) achromatically and anastigmatically balanced.

Pressurized Cooling System
Silent, motor fan cooling unit cools lamp house, condensing system and both sides of film. Projector remains cool-to-the-touch even after hours of operation.

Positive Film Protection
Readily attached, exclusive AO film unit provides positive protection against scratching and warping of film.

Automatic Slide Focusing
All slides — glass, cardboard or metal are automatically centered with the silent Autofocus changer. Slides are put in one side, ejected on the other. No refocusing is necessary after initial adjustment.

AO Patented Heat Filter
provides positive protection from scorching film. Keeps slides and filmstrip safe even after hours of use.

Fingertip Screen Centering
Fingertip control of elevating device gives quick, precise screen centering. Entire front of projector rotates 360° to orient film for horizontal and vertical positions.

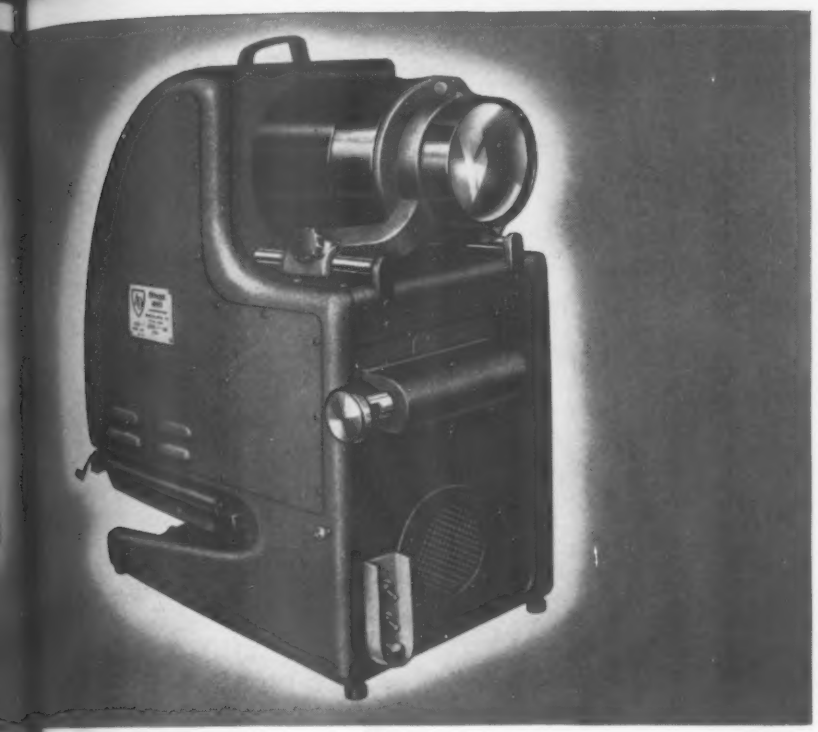
Optical Elements Guaranteed . . .
against breakage from heat using the standard 500 watt lamp.

Lift-off Carrying Case.
Durable all-wood construction finished in gray scuff-proof, waterproof leatherette, supplied with all catalog outfits.

American Optical

AO OPAQUE 1000

THE WORLD'S FINEST OPAQUE PROJECTOR **D-1/AO**



Past experience has shown the AO Opaque 1000 to be one of the best and most practical audio-visual teaching tools ever devised. In schools, churches or clubs, the Opaque 1000 with the *large 10″ x 10″ aperture* lends itself readily to visual education programs. No advance preparation is necessary. The world is your library! Project maps, books, leaves, pictures, and all types of Opaque objects in their natural color brilliance. Even the smallest objects are magnified on the screen in crystal-clear, needle-sharp detail. Compare it for all around performance and you'll find that it's the most versatile, most economical projector on the market today!

Accommodates Variety of Projection Material
Large 10″ x 10″ aperture permits projecting of entire printed or written area of books, letters, maps and numerous opaque materials. Supply of materials for projection is limitless.

Matchless Screen Brilliance
Powerful 1000 watt lamp and AO coated 22″ focus projection lens spreads light evenly to every edge of the screen. Images are sharp, bright and distinct even in a semi-darkened room.

Flutter is Eliminated
Pressure type cooling forces air down and over surface of projected copy. Small objects and lightweight paper are secured for accurate projection. Bothersome fluttering is eliminated.

Cool Operation
Quiet motor driven fan keeps copy safe and cool. Even with platen covered, pressurized cooling protects object from scorching.

Convenient Screen Centering
Spring loaded elevating legs raise projector to proper height for accurate screen centering.

Materials Easily Inserted
Platen automatically locks itself down for convenient insertion of material to be projected, a flick releases it.

Needlepoint Focusing
Lens is carried on a rack and pinion for quick, precise focusing.

Readily Portable
The Opaque 1000, with a conveniently positioned carrying handle, is readily portable. Although it is of strong all-metal construction, it weighs only 38 lbs. and can be moved easily and quickly set up for operation.

Optical Pointer . . .
Projects arrow of light superimposed on any part of screen to spot details of projected image—conveniently located on front of projector.

Roll Feed Attachment
Copy is inserted in one side, rolled out the other. Excellent for all types of material, especially long copy in scroll form.

Carrying Case
Lift-off wooden carrying case has reinforced steel corners . . . sponge rubber linings to hold and protect projector. Case accommodates extra lamp and accessories.

Glass Pressure Plates
Easily mounts on aperture of projector — used to project glossy photographs — holds thick copy such as open books flat for accurate projection.

Dust Cover
Completely covers projector when not in use. Large accessory pocket in dust cover provides convenient storage for lamp cord, extra lamp, etc. All plastic material finished in colors of gray and red.

MODELS

Cat. No.	
3500	AO Opaque 1000 with 4½″ diameter, 22″ focus coated projection lens and optical pointer.
3510	AO Opaque 1000 with 4½″ diameter, 22″ focus coated projection lens, optical pointer and roll feed attachment.

ACCESSORIES

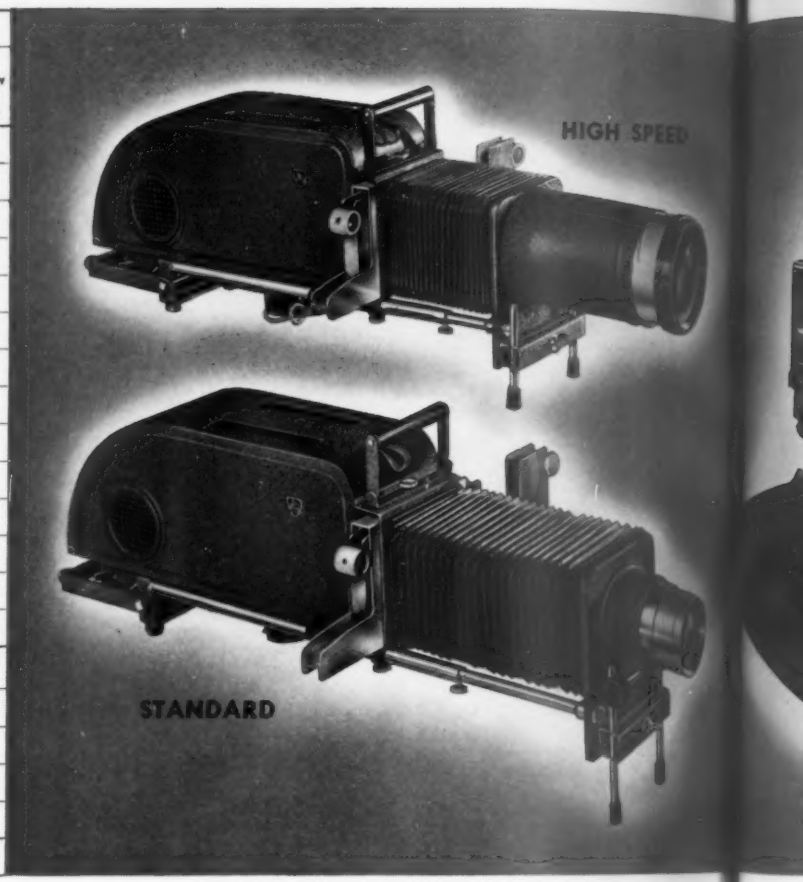
Cat. No.	
3502	Roll feed attachment.
3506	Carrying case.
3507	Glass pressure plate.
3509	Dust cover.
C3967	22″ projection lens.
4036	Extra 1000 watt lamp.
4037	Extra 50 watt lamp (for optical pointer)

American Optical

AUDITORIUM AND CLASSROOM SLIDE PROJECTOR
for 2″ x 2″, 2¼″ x 2¼″ and 3¼″ x 4″ SLIDES

AO GK 750

Cat. No. Model GK	Condensers for 2″ x 2″ Slides	Condensers for 3¼″ x 4″ Slides		Slide Changers for 2″ x 2″ Slides	Slide Changers for 3¼″ x 4″ Slides	Projection Lenses 2⅝″ Diameter	Projection Lenses 1⅞″ Dia.	Projection Lenses 4³⁄₁₆″ Dia.
3591	X			X		6½″		
3591A	X			X		8½″		
3591B	X			X		10″		
3596	X			X		12″		
3597		X			X	12″		
3597A			X		X	16″		
3597B			X		X	20″		
3597C			X		X	24″		
3598		X			X		6½″	
3598A		X			X	8½″		
3599	X	X		X	X	6½″, 12″		
3599A	X		X	X	X	8½″, 16″		
3599B	X		X	X	X	10″, 20″		
3599C	X		X	X	X	12″, 24″		
HIGH SPEED SERIES								
3610	X			X				16″
3610A	X			X				20″
3605		X			X			16″
3605A		X			X			20″
Cat. No.	3592	3607	3608	4112	4104	See Lens Chart		



Available with AO standard (2⅝″ diameter) or high speed (4³⁄₁₆″ diameter) lenses. No other projector in its class offers the unbelievable brilliance, the vivid color reproduction and pinpoint sharpness of the GK 750. Even in large, undarkened auditoriums, the GK provides sparkling brilliance, clarity of image and operating coolness. 2″ x 2″, 2¼″ x 2¼″, 3¼″ x 4″ — all slides are projected with equal convenience and vivid reproduction through a system of interchangeable condensers and complete line of projection lenses.

The AO GK Projector has been specially designed for lecturers and educators who address large and small audiences. It will perform equally well in small classrooms or large auditoriums.

ACCESSORIES

Cat. No.

3602 DeLuxe Leatherette Carrying Case for Standard GK only.

3603 Iris Diaphragm for 2⅝″ Dia. Projection Lenses.

4115 2¼″ x 2¼″ Slide Changer.

3671 Filmstrip Attachment w/3½″ focus Projection Lens.

3941 Front to convert Standard GK to accommodate High Speed Projection Lenses.

4030 Extra 750 Watt Lamp.

PROJECTION LENSES FOR MODEL GK (STANDARD)

THE WIDTH OF IMAGE ON SCREEN (in feet)
Figures on White Background apply to 2″ x 2″ Slides (ASA 23x34 mm)
Figures on Gray Background apply to 2¼″ x 2¼″ Slides (ASA 2.1875″)
Figures on Black Background apply to 3¼″ x 4″ Slides (ASA 2.75x3.0″)

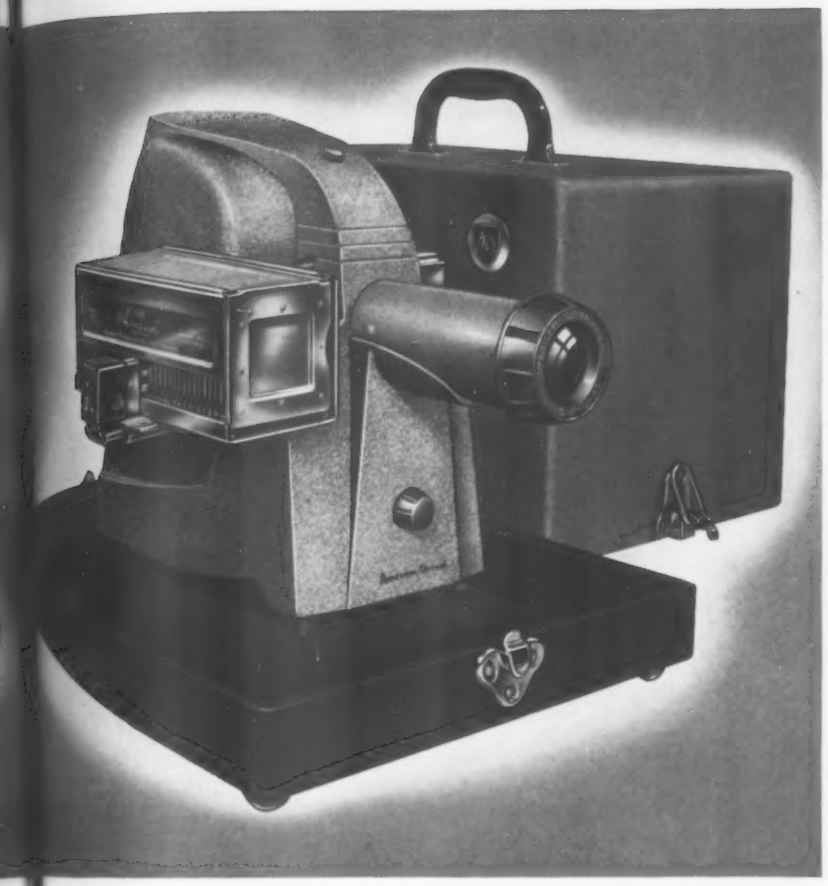
Cat. No.	Focus in inches	f/No.	Distance from Screen in Feet	10	15	20	25	30	40	50	60	70	80	90	100
C3912	6½	2.7		1.9	3.0	4.0	5.0	6.1	8.1	10.2	12.2	14.3			
				3.2	4.9	6.5	8.2	9.9	13.3	16.6					
3920	6½	5.6		4.4	6.7	9.0	11.3	13.6							
C3922	8½	3.65		1.5	2.3	3.0	3.8	4.6	6.2	7.8	9.3	10.9	12.5		
				2.4	3.7	5.0	6.3	7.5	10.1	12.7	15.3				
				3.3	5.0	6.8	8.6	10.3	13.9						
3924	10	4.3		1.2	1.9	2.6	3.2	3.9	5.2	6.6	7.9	9.3	10.6	11.9	13.3
				2.0	3.1	4.2	5.3	6.4	8.6	10.8	12.9	15.1			
				2.8	4.2	5.8	7.2	8.8	11.8	14.8					
3926	12	5.1		1.0	1.6	2.1	2.7	3.2	4.4	5.5	6.6	7.7	8.8	9.9	11.0
				1.6	2.6	3.5	4.4	5.3	7.1	8.9	10.8	12.6	14.4	16.2	
				2.3	3.5	4.8	6.0	7.3	9.8	12.3	14.8				
3928	16	6.8		1.2	1.9	2.6	3.2	3.9	5.3	6.6	8.0	9.4	10.8	12.1	13.5
				1.6	2.6	3.5	4.4	5.4	7.3	9.1	11.0	12.9	14.8		
3930	20	8.5			1.5	2.0	2.6	3.1	4.2	5.3	6.4	7.5	8.6	9.7	10.8
					2.0	2.8	3.5	4.3	5.8	7.3	8.8	10.3	11.8	13.3	14.8
3978	24	10.2			1.2	1.6	2.1	2.6	3.5	4.4	5.3	6.2	7.1	8.0	8.8
					1.6	2.2	2.9	3.5	4.8	6.0	7.2	8.5	9.8	11.0	12.3
FOR FILMSTRIP			(Figured on basis of 18mm x 24mm — standard 35mm single frame film)												
3934	3½	3.5		2.6	4.0	5.3	6.7	8.0	10.8	13.5	16.2	18.9	21.6		

PROJECTION LENSES FOR MODEL GK (HIGH SPEED)

Cat. No.	Focus in inches	f/No.	Distance from Screen in feet	10	15	20	25	30	40	50	60	70	80	90	100
C3940	16	4.6		.8	1.2	1.6	2.0	2.4	3.3	4.1	4.9	5.8	6.6	7.5	8.3
				1.2	1.9	2.6	3.2	3.9	5.3	6.6	8.0	9.4	10.8	12.1	13.5
				1.6	2.6	3.5	4.4	5.4	7.3	9.1	11.0	12.9	14.8		
C3942	20	5.6		.6	.9	1.3	1.6	1.9	2.6	3.3	4.0	4.6	5.3	6.0	6.6
					1.5	2.0	2.6	3.1	4.2	5.3	6.4	7.5	8.6	9.7	10.8
					2.0	2.8	3.5	4.3	5.8	7.3	8.8	10.3	11.8	13.3	14.8

AO 300

2″ x 2″ SLIDE PROJECTOR



The AO 300 2″ x 2″ Slide Projector provides the efficient AO optical system, uniform illumination and cool operation for which AO projectors are justly famous. Every little detail and highlight on the slide will be brought to the screen in sparkling true colors. Projectionists will be amazed at the new brilliance, vivid colors and natural realism that they'll find in their slides when they use the new AO 300 Projector.

Needle-Sharp, true-color reproduction
AO all-coated 5″ projection lens is balanced and color corrected to project slides in their natural, life-like color. Every highlight is emphasized . . . every detail is crystal clear.

Brilliant Screen Illumination
Powerful 300 watt lamp with an exclusive condensing system concentrates light . . . provides more screen illumination than many larger wattage projectors. Light is uniform from edge to edge of screen.

Cool Operation
Triple action blower system forces warm air upward-and-backward away from projectionist. Projector remains *cool-to-the-touch* even after hours of operation.

Automatic Slide Focusing
Exclusive built-in or Airequipt automatic slide changer automatically centers and focuses slides.

Positive Slide Protection
Patented AO heat filter eliminates fear of scorching or burning precious slides.

Rugged Construction
Durable all-metal construction assures many years of efficient operation. Finish of non-chip baked enamel.

MODELS

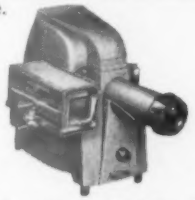


Cat. No.

4910 AO 300, 5″ projection lens with built-in slide changer.



4900 AO 300, 5″ projection lens with built-in slide changer and executive carrying case.



4915 AO 300, 5″ projection lens with Airequipt automatic slide changer.

4930 AO 300, 5″ projection lens with Airequipt automatic slide changer and lift-off carrying case. (Main illustration.)

ACCESSORIES

Cat. No.

4906 Manual slide changer.

P1 Airequipt automatic slide changer with P93 adapter.

4038 Extra 300 watt lamp.

4902 Executive carrying case.

4903 Lift-off carrying case.

American Optical

2″ x 2″ SLIDE PROJECTOR

AO PERFORMER 500



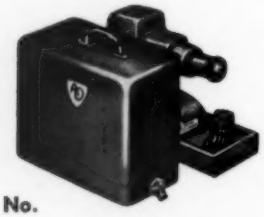
American Optical quality and precision are incorporated in the new AO Performer 500 at a remarkably low price. It is, without a doubt, the finest, 500 watt, 2″ x 2″ slide projector on the market today. AO's traditional excellent projection performance . . . ease of operation . . . compact structure . . . attractive design . . . and other famous AO features make this a projector fit for the most exacting professional use. Available with standard push-thru slide changer or Airequipt Automatic.

MODEL

Cat. No.

3860 AO Performer 500 with push-thru, manual slide changer and 5″ projection lens.

ACCESSORIES



Cat. No.

3825 Lift-off carrying case.
3822 Slide changer for 2″ x 2″ slides.
C3862 5″ focus projection lens.
4005 Extra 500 watt lamp.

Brighter Screen Illumination
500 watt lamp with two element condensing system throws up to twice as much light on screen . . . light is spread uniformly from edge to edge of screen.

Needle Sharp Color Reproduction
Exclusive 5″ all-coated lens brings out all the natural brilliance in your slides. Every little detail is projected in life-like realism.

Automatic Slide Focusing
Patented Autofocus push-thru slide changer automatically focuses each slide. Just regulate once and each slide is projected in sharp, clear focus. Also accommodates Airequipt automatic slide changer.

Blower Cooler Operation
Triple action blower cools lamp, film and optics. Projector remains cool and safe even after hours of continuous use.

Positive Screen Centering
Easily accessible elevating device adjusts screen image with fingertip control.

Perfect Slide Protection
AO's patented heat filter provides positive protection against scorching precious slides . . . even after hours of continuous projection.

Rugged Construction
Durable all-metal construction assures years of use. Projector is finished in attractive "starlite" gray chip-proof baked enamel.

Lift-off Carrying Case
Durable wooden carrying case is finished in gray scuff-proof, waterproof leatherette.

American Optical

AO REVIEWER 500

2¼" x 2¼" and 2" x 2" SLIDE PROJECTOR **D-1/AO**



Here is one of the most versatile slide projectors available today. It gives brilliant projection results in both 2¼" x 2¼" and 2" x 2" slides. Slide changer adapter permits quick, easy conversion from one size to another. Both size slides are projected in crisp, sharp detail and in vivid, natural color hues.

Every exclusive AO projector feature — optical and mechanical — provides improved operational accuracy and greater all-around satisfaction in performance. All of these superior features make the AO Reviewer 500 a natural for those who want the convenience and versatility of a 2¼" x 2¼" and 2" x 2" projector.

Brilliant Screen Illumination
Powerful 500 watt lamp with triple element condensing system concentrates light . . . increases effective wattage almost double . . . provides uniform screen illumination from edge to edge of screen.

True color Reproduction and Pin-Point Detail
with exclusive all-coated lenses (5" or 7" focal length), balanced and color corrected, give brilliant image . . . sharp and clear . . . brings out every color highlight.

Automatic Slide Focusing
New silent Autofocus slide changers automatically and accurately focuses each slide — focus once and all succeeding slides are in focus.

Cool Operation . . .
even after hours of operation with the patented triple action fan. Powerful silent blower cools lamphouse, condensers and slides.

Easy Screen Centering
. . . with fingertip elevating device . . . can be regulated quickly and accurately.

Positive Slide Protection
Patented AO heat filter eliminates fear of scorching slides.

Rugged Construction
Sturdy all-metal construction, finished in attractive two-tone gray and maroon wrinkle.

Lift-off Carrying Case
Durable wooden case is finished in scuff-proof, water repellent maroon leatherette.

MODELS

Cat. No.	
3840	Model Reviewer 500, with 5" lens for 2¼" x 2¼" slides.
3840A	Model Reviewer 500, with 7" lens for 2¼" x 2¼" slides.
3840B	Model Reviewer 500, with 5" and 7" lenses; slide changers for both 2¼" x 2¼" and 2" x 2" slides.

ACCESSORIES

Cat. No.	
3842	Slide Changer, 2¼" x 2¼" (2¾" x 2¾").
3822	Slide Changer for 2" x 2".
3843	Adapter to use 2" x 2" slide changer, No. 3822.
3844	5" all coated projection lens with adapter for Reviewer 500.
3846	7" all coated projection lens with adapter for Reviewer 500.



3845	Lift-off Carrying Case.
4005	Extra 500 watt lamp.

American Optical



GUARANTEE

All optical elements in American Optical Projectors are unconditionally guaranteed against breakage from heat. Any projector optical element which becomes damaged due to heat, while using standard lamp wattage, will be replaced free of charge.

AN EVEN MORE IMPORTANT GUARANTEE

. . . is the American Optical trade mark on every AO Projector. It means superior quality, dependable performance for you — with a fast, friendly service organization right behind it, always ready to give you a hand. See your local American Optical Projector Dealer for more complete information and demonstrations today!

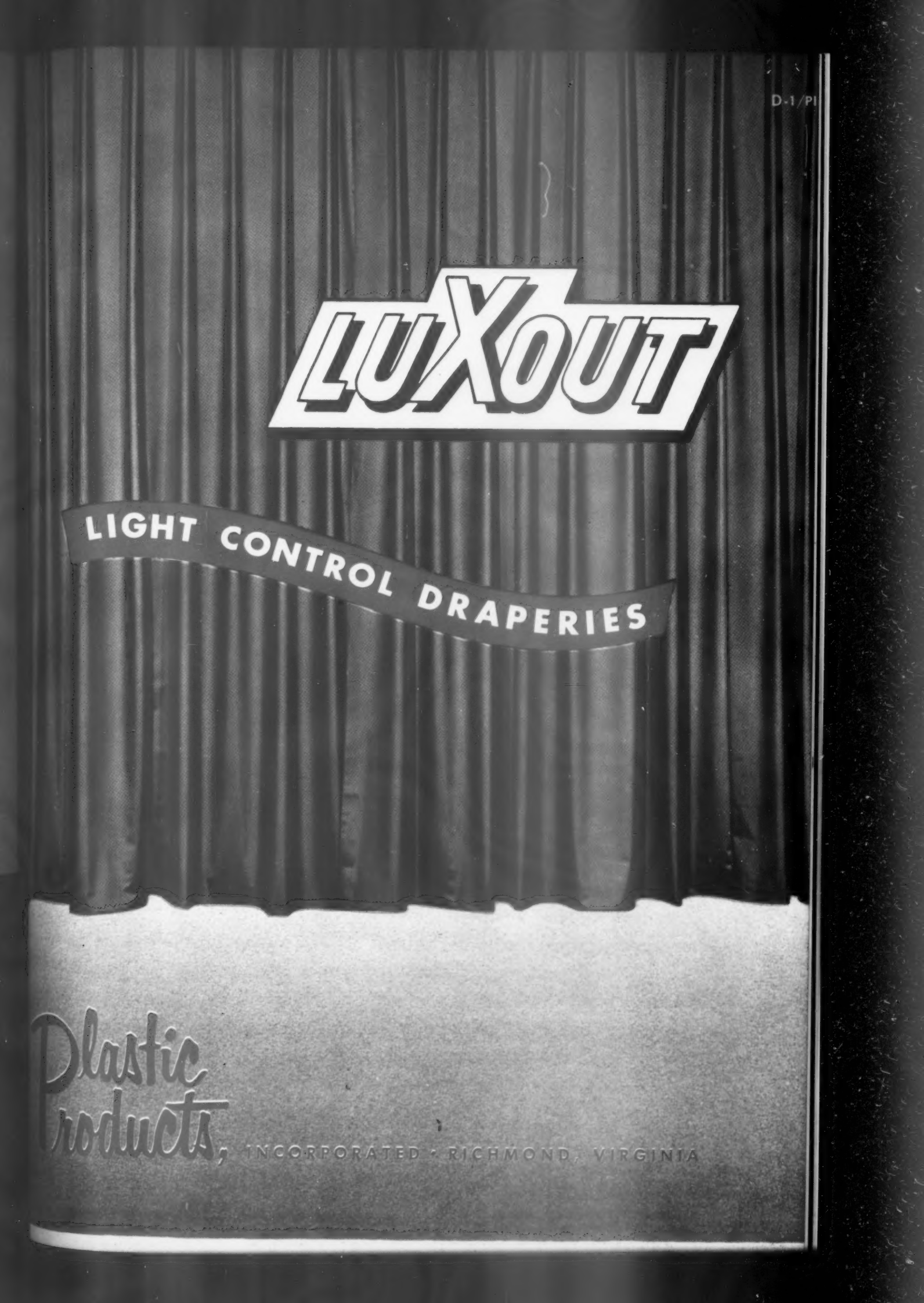
P-2852

4 PRINTED IN U.S.A. 55

American Optical

CHELSEA, MASSACHUSETTS

Manufacturers of the most complete line of still projectors for amateur, professional, religious and industrial use.


D-1/PI
LUXOUT
LIGHT CONTROL DRAPERIES
Plastic Products, INCORPORATED · RICHMOND, VIRGINIA

LUXOUT

LIGHT CONTROL DRAPERIES



Effective light control makes possible a good tonal quality in projected pictures

Audio-visual projection rooms are declared a must by modern education procedures.

Now Luxout Light Control Draperies can make every room suitable for audio-visual equipment. In fact, many educators have discovered the inadvisability of having a single projection room, preferring light control for each classroom so all teachers may simultaneously use audio-visual teaching methods.

Auditoriums built before the days of audio-visual education can be economically light controlled . . . hospitals often have need for rooms to be either shaded or economically darkened . . . salesmanagers get their messages forcefully across by the use of motion pictures shown in darkened offices . . . church schools find audio-visual methods most effective.

FOR . . .

Schools
Auditoriums
Hospitals
Offices
Churches

HAVE A LONG USEFUL LIFE!

Because: They are made of the famous heavy gauge DUR-O-LITE plastic fabric noted for its strength and resistance to wear.

Because: They are fabricated—not by sewing—but by the Thermo-seal process of electronic heat sealing, which assures smoother, stronger seams, that do not tear but give long years of useful life.

What Are LUXOUT Draperies?

1. They are attractive, efficient, durable and economical draperies that control the light level of a room.
2. They are made of the well known heavy weight "DUR-O-LITE" plastic.
3. They are made by the Thermo-seal process which assures a smoother, and much stronger drapery than is possible by the usual sewing method.
4. They are easily installed to fit any window or to cover any desired light area.
5. They improve the acoustics of the room.
6. They are fire resistant.
7. They are easily cleaned.
8. They are less costly than cloth draperies.
9. They are available in a wide range of colors to suit any color scheme.



An adequately lighted classroom with Luxout draperies for light control



The same room made ready for audio-visual instruction

LUXOUT LIGHT CONTROL DRAPERIES

Officially Approved

Read What the National Education Association says:

WIDESPREAD RECOMMENDATION

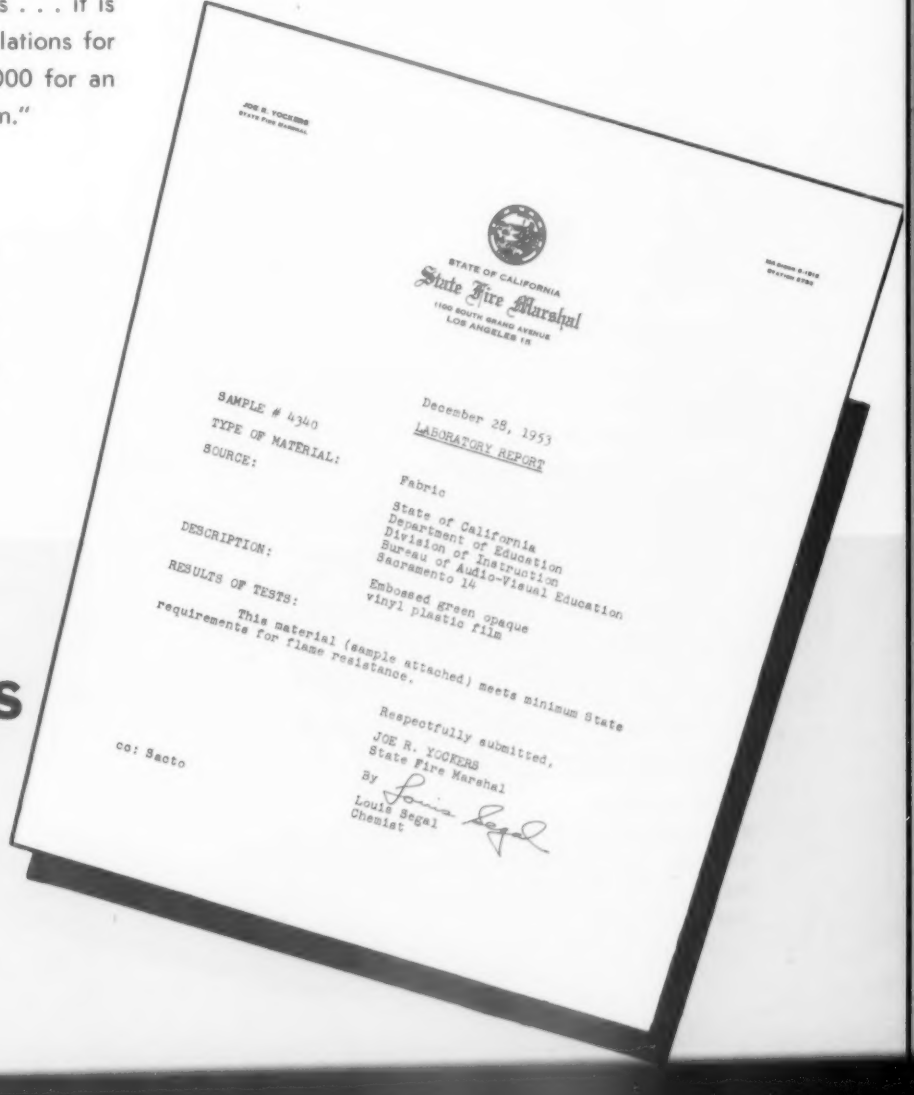
"The results of a survey indicate widespread recommendation of drapes as an effective and economical method of light control, and the trend seems to be toward the use of opaque, fire resistant plastic drapes installed on tracks."

MORE ECONOMICAL

Tests show that outside light can be controlled in the average classroom by the installation of drapes . . . it is more economical to provide light control installations for all classrooms than to spend $20,000 to $30,000 for an additional room to be used as a projection room."

BROADENS AUDIO-VISUAL USE

It might also be emphasized that the needs of children are not met when only one room in a school is adequate for use of audio-visual materials, or when classes must be shifted from the normal learning environment, the classroom, to a special projection room."



JOE R. YOCKERS
STATE FIRE MARSHAL

STATE OF CALIFORNIA
State Fire Marshal
1100 SOUTH GRAND AVENUE
LOS ANGELES 15

SAMPLE # 4340
TYPE OF MATERIAL:
SOURCE:

December 28, 1953
LABORATORY REPORT

Fabric

State of California
Department of Education
Division of Instruction
Bureau of Audio-Visual Education
Sacramento 14

DESCRIPTION:

Embossed green opaque vinyl plastic film

RESULTS OF TESTS:

This material (sample attached) meets minimum State requirements for flame resistance.

Respectfully submitted,
JOE R. YOCKERS
State Fire Marshal
By Louis Segal
Louis Segal
Chemist

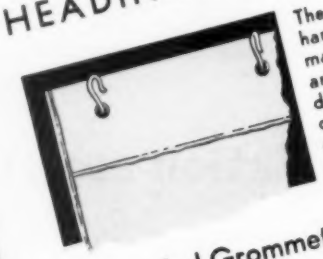
cc: Sacto

LUXOUT DRAPERIES

Meet Stringent California Laboratory Fire Test

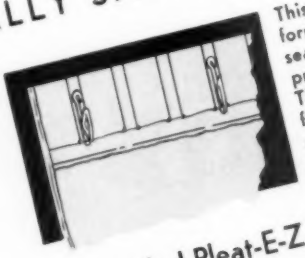
LUXOUT

HEADINGS MADE IN TWO EQUALLY SATISFACTORY TYPES



Concealed Grommet Type

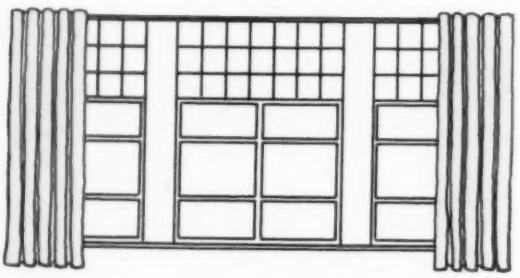
The grommets into which the hanging hooks are inserted, are made in a heading fold so they are concealed from view when drape is hung, on either wall or ceiling track. Can be used for drapes either with or without pleats.



Concealed Pleat-E-Z Type

This type has a series of slots formed by Thermo-electric heat sealing process into which pronged hooks are inserted. These slots are concealed from view when drape is hung and permit the drape to be either plain, pleated or French pleated.

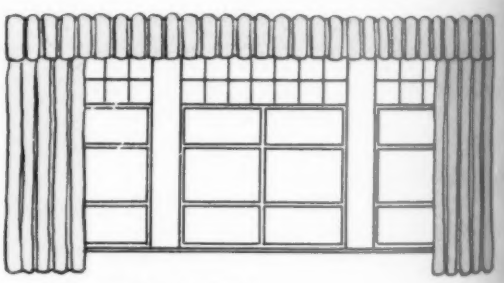
Custom Style
To Meet Every Nee



1

CONCEALED HEADING STYLE

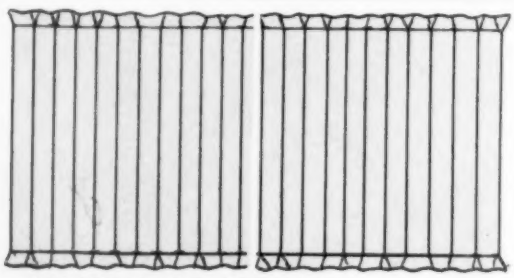
This is a simple installation hung on mounting track and is avilable for windows of every width. Either Grommet or Pleat-E-Z heading may be used.



2

VALANCE STYLE

This style normally has exposed grommets in the heading which are hidden from view by the valance. The valance gives a home-like appearance to the room. If desired, Pleat-E-Z type headings can be supplied.

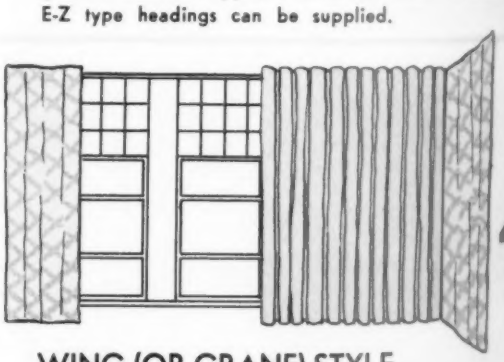


3

WIND-PROOF STYLE

(Patent Pending)

Being fastened at both top and bottom, drapes stay in place even when air is circulating. This style solves many ventilating problems. Either Concealed Grommet or Pleat-E-Z headings may be used.



4

WING (OR CRANE) STYLE

Consists of a window rod on which the opaque drapes are hung, and two shorter wing rods, one on each end, for decorative drapes behind which the opaque drapes are hidden when drawn.

LUXOUT **LIGHT CONTROL DRAPERIES**

MADE OF DUR-O-LITE ARE AVAILABLE IN A

Variety of Materials

All Dur-o-Lite has an embossed surface assuring a rich, luxurious drapery.

OPAQUE "DUR-O-LITE"

To obtain complete darkness in a room the following are obtainable:

1 **"Simplex"**
Available in Hunter's Green and Teal Blue—both equally opaque

2 **"Dual"**
Two-ply laminated: Teal Blue for the opaque windowside and your choice of Gray or Wine for the room side

3 **"Double Drape" [Duplex]**
This in reality is two drapes hung on a single track. The opaque or window drape may be either Hunter's Green or Teal Blue. The room side drape may be your choice of: Pastel Blue, Pastel Green, Eggshell, Royal Blue, Yellow, Chartreuse or Wine.

TRANSLUCENT "DUR-O-LITE"

To eliminate window glare without greatly diminishing the amount of light there are the following three color choices: Pastel Blue, Pastel Green and Eggshell.

DECORATIVE "DUR-O-LITE"

The following four colors are translucent but are used for their decorative values rather than for light control. The colors are Royal Blue, Yellow, Chartreuse and Wine.

ARCHITECTURAL SPECIFICATIONS

LuXout

PLASTIC LIGHT CONTROL DRAPERIES

---

1. FABRICATION

The LuXout lightproof draperies are manufactured by the THERMO-SEAL process, a special method of electrically heat-sealing plastic film.

2. FILM COMPOSITION

The plastic film of which the LuXout draperies are made is DUR-O-LITE, a specially manufactured film passing the following tests and completely suitable for room darkening use.

(a) TEAR: Film must pass a minimum of 100 grams/mil Elememdorf tear.

(b) OPACITY: The Simplex opaque material shall be 100% opaque. The Dual material shall be 100% opaque except for a few scattered pin points of colored light which are characteristic of this material. The balance of the materials will vary in translucency.

(c) FLAMEPROOF: Film must be flameproof, that is, the material must cease burning when the flame from a Bunsen burner or match is removed from the film.

(d) GAUGE TOLERANCE: The average thickness shall be .008" gauge, plus or minus 10 percent, except for the Double Draperies (Duplex). The average thickness shall be determined from five uniformly spaced readings taken across the width of the material.

SPECIFICATIONS FOR TRACK

Kirsch Double Duty or Heavy Duty track. Steel core cording for tracks over 18 feet. Pulleys and Spring Tension Pulleys—ball bearing. Nylon track shoes on plain carriers and on overlapping carriers.

RICHMOND, VA. Plastic Products INCORPORATED



aids to education

sound systems	2
16 mm projectors tape recorders	4
intercoms TV eye high fidelity	6
phonographs records	8
radios television	10
transmitters electron microscope test equipment	12
air conditioners ranges tubes	14

educational services
RADIO CORPORATION OF AMERICA
Camden • New Jersey

research

The primary aim of RCA Laboratories, the principal research organization of RCA, is to increase the usefulness of radio, television and electronics to the Nation, to the public and to industry. RCA scientists and research engineers work to improve methods, devices, production and operation in every branch of electronics and to create the ideas that bring about the development of new products and services. At the same time, RCA Labora engage in fundamental research, with the that all contributions to knowledge eventu of practical worth, though this may not be at the outset, and that, in the long run, fund tal discoveries are of the greatest value.

This program has helped insure the conti vitality and progressive development not o the company and its products, but also of t tire electronics industry.

sound systems

Illustrated below are two central control sound systems. RCA manufactures a complete of sound equipment, plus individual items su microphones, amplifiers, speakers, etc., whic provide any type of sound system required. Sound Distributors and RCA Field engineer available for consultation on your school s requirements.



single channel consolette

Type MI-14950, single channel console, designed for the small and medium sized school, furnishes a centrally located and controlled sound distribution system. Unit permits immediate transmission of news, announcements, recorded programs, time signals or material received on AM/FM tuner to areas in which a speaker is mounted. Communication between any remote area and the control desk is accomplished without interference to program being broadcast.

- Broadcast station control room type console
- Provision to amplify and control distribution of AM/FM and/or recordings
- Up to 10 low or high impedance microphone inputs
- One phonograph input selector
- Intercommunication on separate independent channel
- Single emergency switch to broadcast instant signal to all
- Program monitored visually or orally prior to distribution
- Up to 40 rooms contacted individually, in groups, or all taneously
- All controls located within 10½ inches of height
- Dirt protected room designator cards on each room switch panel
- 30 watt program amplifier
- 10 watt intercommunication amplifier
- Smooth steel construction of symmetrical appearance
- Finished umber gray
- All parts easily accessible for servicing
- Approved by Underwriter's Laboratories, Inc.
- Tape Recorder input and output

ality

om its earliest days, the name of RCA Victor been synonymous with the word quality. The bination of the finest in parts and components, rt craftsmen, efficiency in manufacturing, and ant inspection, insures the best in the final uct—insures RCA quality. And a quality uct means greater satisfaction and longer life, ing in a lower cost over the lifetime of the uct. Schools deserve the best—they deserve ity RCA audio-visual products.

service

Behind RCA products is the RCA Service Company, a nationwide organization of factory trained specialists devoted to the installation, maintenance, and servicing of RCA electronic products and equipment. It operates in the technical and industrial fields, but its principal manifestation to the public is in connection with television receivers and air conditioners. RCA distributors of other products maintain their own staff of RCA-trained technicians to provide the best possible service.



dual channel deluxe console

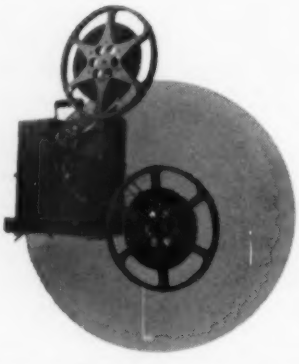
e MI-14951 dual channel deluxe console furnishes a rally located and controlled sound system permitting ribution of program to as many as 200 rooms or areas. diate transmission may be made of news, notices, ded music, emergency signals and programs received AM or FM tuners. Special events in gymnasium or torium may be broadcast to any area in which a speaker mounted. Communication between control board and any er area is accomplished without interfering with broad- program. This allows broadcasting of two programs ltaneously while conversing with any other area by s of the intercommunication system on a "third nel."

WHERE OBTAINED: RCA Sound equipment is sold through authorized RCA Sound distributors. The location of one nearest you will be supplied on request. These distributors will be glad to recommend the best equipment for what you want to do, and quote you complete prices.

- Broadcast station control room type console
- All controls located within height of 10½ inches
- Additional room selector banks may be added to control up to 200 rooms
- Up to 200 areas contacted individually or simultaneously
- Two individual program amplifiers permit simultaneous broadcast of different programs
- 10 watt intercommunication amplifier
- Individual intercom amplifier permits 2-way conversation
- Four low or high impedance microphone inputs
- Tape recorder input and output
- Provision to amplify and control distribution of AM/FM tuners and recordings
- Single switch operation to broadcast emergency signals to all speakers
- Program monitored visually or orally prior to distribution
- Constructed of smooth steel—Finished in umber gray
- Parts easily accessible for servicing
- Approved by Underwriters' Laboratories, Inc.

16mm projectors

All RCA 16mm projectors are characterized
simplicity of operation and setup, brilliant li
superlative sound, and long operating life. T
are compact and light in weight, yet ruggedly c



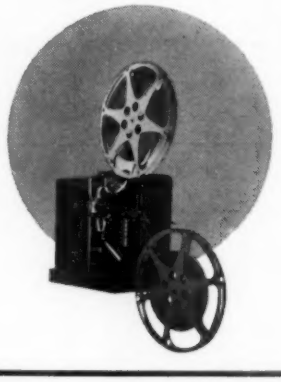
Lightweight. Portable. Compact, complete in single case with speaker mounted in detachable cover. Ideally suited for school lecture halls, classrooms.

400 junior

This professional quality, whisper-quiet 16mm sound or silent projector will accommodate up to a 1,000 watt, standard, medium, prefocussed projection lamp . . . 750-watt lamp supplied. Projection lens: 2-inch, F 1.6, coated. Film capacity: 2000 feet. Amplifier output: 7 watts. Power supply required: 105- to 125-volts, 60 cycles single phase A.C. Sturdy fabricoid covered metal case is reinforced by external hardware finished in highly polished chrome. Projector beautifully styled, finished in blue-green Hammertone with polished chrome and aluminum fittings.

The projector is mounted on the cabinet base. Sepa
removable covers for accessibility to projector. Speaker
vides wide frequency response and sensitivity. Plugs at
ends of connection cord facilitate setting up and dis
tling for packing, facilitate interchanging projecto
desired. Projector finished in blue-green Hammertone,
polished chrome and stainless steel parts, and
rounded corners. Projector operates from 105- to 125-
60-cycle, single phase A.C. power source.

400 senior



Heavy-duty. Portable. A
case equipment, projector
speaker are streamlined,
weight, and of advanced
neering and design. 10 watt
put. For school auditoriums
projection rooms where he
duty is expected. Also avail
as a one-case unit.

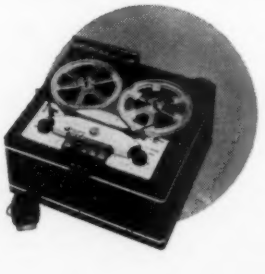
tape recorders

RCA Tape recorders feature high quality, push-button operation, two speed operation, and overall ease of recording and playback. Also available is a complete line of accessories including Sound Tape, Console Speakers, etc.

WHERE OBTAINED: RCA Tape Recorders are sold through regular RCA Victor radio and television dealers in your vicinity. They will be glad to demonstrate any model for you.

Attractive new styling in handsome grey tones. T
speakers: 2 woofers 1 tweeter. Larger case, for opti
sound. Remote control. 7-watt push-pull big power a
fier. 2 external speaker jacks. Counter-index. Au
power cord. Built-in storage compartments for mike,
and power cord.
The Executive, Model SRT-403, comes complete w
remote control accessory, counter-index, patch cord, 7"
of sound tape, load-easy empty 7" reel, microphone.

executive



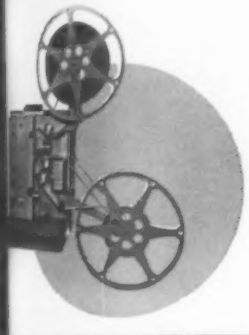
technical data
Output: 7 watts. Size: 10" x
x 14¼". Speed: 3¾" -
Weight: 35 lbs. Speakers:
5", one 4". Tracks: dual
quency Response: 40 to
c.p.s.

projectors

tape recorders

...ted for hard school use. Available also is a ...roduce Kit for playing magnetic striped films ...ll "400" models. RCA also has a complete line ...5mm sound projectors for larger installations.

WHERE OBTAINED: RCA 16mm projectors are sold through authorized RCA Visual Products distributors. If you are not familiar with such a distributor, we will be glad to supply his address.



Records magnetic tracks. Plays back. Erases and re-records. Reproduces optical and magnetic track. Projects top quality pictures at sound or silent speed. Operates as public address system. Available in a single or two case unit.

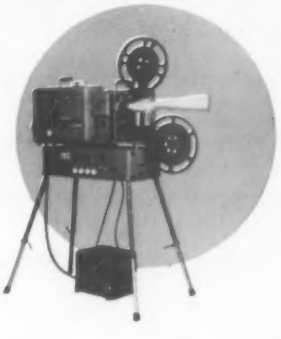
...magnetic recorder projector

...A 400 magnetic recorder projector permits listening to ...e recording within seconds after recording. Reuse film, ...ging commentary as often as desired. Requires no ...ert knowledge to record or play back. Saves time. Saves ...dio charges. Production of a limited number of prints ...thin a modest budget is at last feasible for schools.

...Sound on magnetic tracks is in every way superior to the ...t available from optical track method. Frequency re...nse is 80 to 7200 cycles as compared with optical ...nge of 100 to 5000 cycles. Background noise is vir...lly eliminated in magnetic track reproduction. Sound ...s not become noisy with wear or mishandling, nor can it ...eriorate from scratching.

Assembled in 5 minutes from 5 easy-to-carry cases. Gives the utmost in picture brilliance and faithful sound reproduction for indoor and outdoor projection. Projector is standard RCA 400 with safety and operation features required for professional equipment. Lamphouse incorporates new type arc lamp operating at either 10 or 30 amperes, giving 750 or 1600 lumens of light. Ten ampere carbons burn two hours, fifteen minutes without change. Thirty ampere carbons burn fifty-six minutes. Amplifier is adaptable to all commonly used auditorium speaker equipments, has separate volume controls for picture sound, microphone and record player inputs. Speakers can be selected as desired. Accessory equipment includes 2000-foot reel, sound exciter lamp, oil can, cleaning brush and lens tissue.

"porto-arc"



Combines in five cases the finest in picture and sound with the abundance of pure white light obtainable only with arc lamps. Quick, simple, accurate controls. Maximum tilting range. Powerful 25 watt amplifier. Especially built for portability with professional results.



technical data

Output: 2 watts. Size: 10" x 15⅞" x 14¼". Speed: 3¾" - 7½". Weight: 32 lbs. Speaker: two 5". Tracks: dual. Frequency Response: 50 to 8000 c.p.s.

senior

...ctive new styling in smart blue. Two large speakers ...l-around sound. Large case for bigger and better ...d Counter-index. Attached power cord. Remote con...facility (extension switch-cord optional at extra cost). ...a storage compartments for mike, tape and power

...enior, Model SRT-402, comes complete with: 5" reel ...nd tape, load-easy empty 7" reel, microphone, coun...er, patch cord.

Attractive new styling in rich green color. Bi-coustic tone principle. Attached power cord. Remote control facility (extension switch-cord optional at extra cost). Built-in storage compartments for mike, tape and power cord. Lowest in price to meet all school budgets.

The Deluxe, Model SRT-401, comes complete with 3" reel of sound tape, load-easy empty 7" reel, microphone.

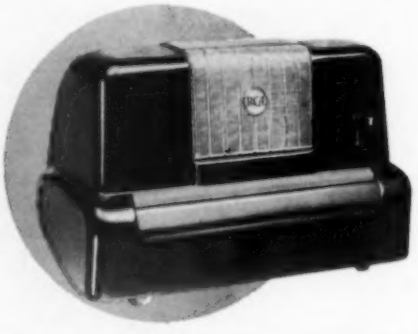
deluxe



technical data

Output: 2 watts. Size: 9" x 13⅞" x 14¼". Speed 3¾" - 7½". Weight: 28 lbs. Speaker: one, 5" x 7". Tracks: dual. Frequency Response: 50 to 8000 c.p.s.

intercom systems



Intercom systems provide instantaneous communication between two or more people. Superintendents, Principals, Business Managers, Purchasing Agents and many others have found such a system to be an economical, effective method to reach key personnel at the flick of a switch. They are sold through the same RCA Sound distributors noted on page 3.

Furnish amplified, two-way conversation between two or more points, wherever flexible, intelligible intercommunication is desired. Contact is direct and instantaneous . . . a whisper or a shout . . . so true that voices are recognized immediately. Results are a more completely coordinated school organization, fuller utilization of man-power through elimination of delays, less office-walking, fewer interruptions, more efficiency.

Complete flexibility. Future expansions practical. All Master Stations permit connection with other Master Stations, Remote Stations or any combination of Masters and Remotes up to 6 or 12 selector key capacity.

CABINET: matte black with satin chrome grille, 10⅜" x 7⅛" x 5⅞". POWER REQUIRED: 105/125 V. A.C., 50/60 cycles, 25 watts. OUTPUT IMPEDANCE: 15 ohms. PM SPEAKER IMPEDANCE: 15 ohms. TUBES: one each, RCA-6SL7GT, 6V6GT, 6X5GT. PILOT LIGHT: 6.3 volt, bayonet socket, 250 M.A. INTER-STATION WIRE SIZE: No. 22 or larger. WIRING CONNECTIONS: Cable and Junction Box. SHIPPING WEIGHT: 10½ lbs.

high fidelity components

RCA High Fidelity equipment is so designed that each component is intermatched or designed to work with any other unit. All units are of superb

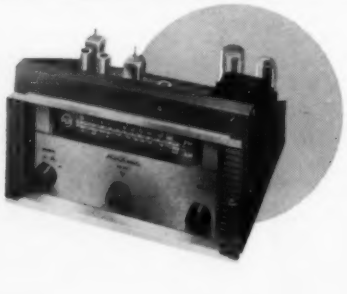


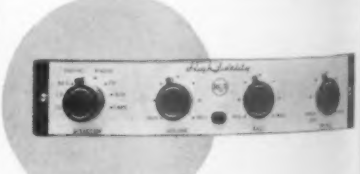
record changer

Type SCR-51. De-luxe, three speed, automatic. Shuts off automatically at end of last record. Heavy duty 4-pole motor assures constant speed. Turntable weighted for smooth, rumble-free operation. Sound cut off by switch during cycling operation. Interchangeable spindles for standard center-hole and 45 rpm operation. Interchangeable plug-in type reproducer heads. Less Cartridge and stylus. 100/130 and 200/250 volts, 60 cycles A.C. Cabinet space required: 15" long x 13¼" wide. Clearance: 5¾" above motor board, 3½" below.

Type ST-1. Precision built, high quality radio tuner ideally suited for music system use. Excellent reception over standard AM-FM bands. Sensitivity: better than 5 microvolts. Output: 2 volts at less than 0.05% distortion. Response: ± 1 db from 40 to 15,000 c.p.s. Band switch, volume control and tuning control. Tube complement: 3 RCA 6CB6, 2 RCA 12AT7, 1 RCA 12AU7, 2 RCA 6AL5, 1 RCA 6X5 GT. Power required: 115/120 volts, 60 cycles, A.C. Power consumption: 50 watts. Dimensions: 13½" wide x 8½" deep x 6¾" high.

am-fm tuner





de luxe pre-amplifier

Type SV-1. Especially for use with power amplifiers of the RCA "Matched Hi-Fi Line." Response with Type SP-10 or SP-20 Power Amplifier—On radio: 20 to 20,000 c.p.s. ± 1 db. On Ortho: 30 to 15,000 c.p.s. ± 1.5 db. Controls: selector, phono (Ortho, LP, AES, 78); radio; TV; aux. One volume control for all inputs. Bass control, treble control. Operates from auxiliary power supply in RCA power amplifier, Type SP-10 or SP-20. Dimensions: 9½" wide x 5¾" deep x 1⁵⁄₁₆" high.

intercom system /TV eye

high fidelity

TV eye



Educational institutions are using the RCA TV eye as a practice TV camera, as a means to show inherently small demonstrations and experiments to large groups, and to distribute a program to several different locations. The equipment is sold through RCA Electronic Distributors. The address of one nearest you will be supplied on request.

Extends human vision up to 2000 feet away. Permits viewing different locations simultaneously or in rapid succession where it would be dangerous, time-consuming, expensive or difficult to view personally. Many individuals can see the same scene at widely separated viewing centers. Low installation and maintenance cost. Camera weighs only 4½ pounds. Operates on closed circuit over any standard TV receiver. Remote controlled camera. Vidicon protection circuit prevents damage in event of failure of deflection tubes.

Inexpensive remote viewing of processes, locations and operations. Picture transmitted by single cable to control unit and receiver monitor. Use of multiple viewers and receivers give full flexibility of subjects and audience size. Close-ups of experiments, demonstrations, and microscopic studies can be enlarged and projected for large student groups.

Every day, RCA engineers and users of TV Eye in schools are discovering new applications for this human vision extension that permits an instantaneous picture of almost anything to be sent to distant points in a building, or across the campus . . . conquering the obstacles of time, space, danger, and man-made or natural barriers.

professional quality, designed by RCA engineers—specialists for more than a quarter century in precision electronic equipment.

WHERE OBTAINED: Are sold through RCA Electronic Distributors. The name and address of one nearest you will be gladly supplied on request.

Type SP-10. Response: 20 to 20,000 c.p.s. Input: 5 volts for maximum output. Input impedance: 100,000 ohms. Output impedance: 4, 8, 16 ohms. Output: 10 watts at less than 0.5% distortion from 50 to 15,000 c.p.s. At 3 watts output: less than 0.5% distortion from 30 to 20,000 c.p.s. Auxiliary power supply available: 6.3 volts @ 0.9 amperes; 250 volts D.C. @ .008 amperes. Tube complement: 1 RCA 12AU7, 2 RCA 6AU6, 2 RCA 6V6, 1 RCA 5Y3GT. Power supply required: 105/125 volts, 60 cycles, A.C. Dimensions: 13½" wide x 9" deep x 10½" high. 20 watt amplifier also available —Type SP-20.

power amplifier



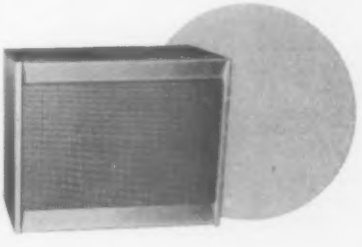


duo-cone 15-inch speaker

Type LC-1A. Designed by Dr. Olson, head of the Acoustical Laboratories of the David Sarnoff Research Center. Acoustical domes on speaker's cone breaks unit's symmetry to eliminate interference without compromising reproduction of highs and lows. 20 watts, with a response of 50 to 16,000 c.p.s. in RCA Type SC-15 enclosure or equivalent. Extremely wide angle of projection. Impedance: 16 ohms. Distribution Angle: 120 degrees. Magnet Weight: 2.5 lbs. Overall Diameter: 17 inches. Depth: 7 7/16". Weight: 21 lbs. Other 8 and 12 inch extended range speakers also available.

SC-8, SC-12, SC-15. Ideal speaker enclosures, from functional and esthetic standpoints, to "fit-in" with any decor. Cabinets usable horizontally or vertically. Feature of these phase-inversion type cabinets is the use of diagonally placed damping material for absorbing cabinet resonances. Cabinet Measurements, exclusive of legs: 15" speaker: 32" x 25" x 16"; 12" speaker: 32" x 25" x 12"; 8" speaker: 28" x 22" x 12". Mounting Legs: 3" black legs for all types. 6" legs in blonde, mahogany and walnut or unfinished. Finishes: blonde, mahogany, walnut, or unfinished.

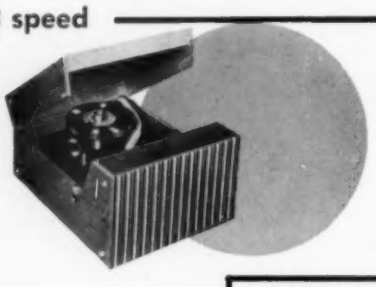
cabinets



"Victrola" phonographs

WHERE OBTAINED: All phonographs are sold through regular RCA Victor Radio and Television dealers throughout the United States. Such dealers will be glad to demonstrate these and many additional models for you, and quote you school prices.

3 speed

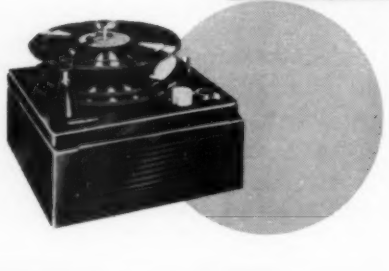


2ES38

PORTABLE PHONOGRAPH
This distinguished portable will play all your records . . . from any 110 volt AC outlet! Giant 8" speaker and "Golden Throat" acoustical system offer superb full tone. External controls are recessed on side of cabinet. Has special tone control. Extra long power cord. Tone arm locks down for protection while traveling. Luggage-type case of durable brown leatherette. Smartly striped grille cloth. Height, 9¾"; Width, 14¾"; Depth, 18¾".

AUTOMATIC TABLE PHONOGRAPH
Complete. Compact. Ready to give your students more musical enjoyment. Changer stops automatically after last record. Includes big 45 rpm spindle and recessed storage space for it. Extra long power cord. True, faithful "Golden Throat" tone. Glossy dark maroon finish. AC. Height, 10¾"; Width, 13⅞"; Depth, 13½".

2ES31

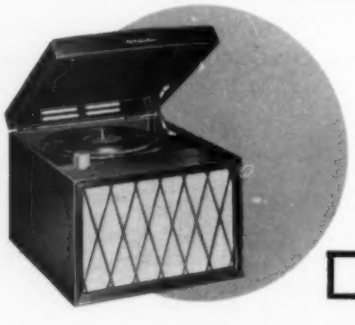




2JS1

AUTOMATIC ATTACHMENT
Gives all the conveniences of the "45" system, plus new playing ease for 33⅓ and 78 rpm records, through any public address system, radio or TV set. Lightweight tone arm with twin stylii. Strong steady motor turns balanced turntable smoothly. Plays 10- and 12-inch records intermixed, in the same speed. Maroon finish. AC. Height, 8"; Width, 13¾"; Depth, 13¼".

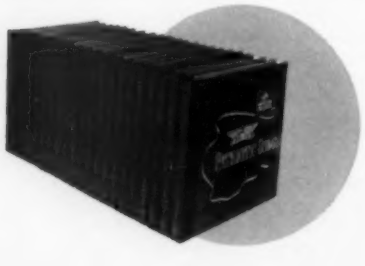
high fidelity



3HES5

3-SPEED ORTHOPHONIC TABLE PHONOGRAPH
Unquestionably one of the finest table phonographs ever offered by RCA Victor. Music has new power and beauty. And the price is startlingly reasonable. 3-speed automatic changer . . . big 8-inch "Olson-design" curvilinear speaker . . . wide-range amplifier . . . ceramic pickup and synthetic sapphire stylii . . . separate calibrated "on-off-volume," treble and bass controls. Cabinet in sleek mahogany or limed oak finish. Provision for attaching companion speaker. AC. Height, 13"; Width, 16"; Depth, 18".

records



basic library

FOR ELEMENTARY SCHOOLS . . . A planned course for teaching music appreciation, providing basis for emergence of ideas originating with the children. Teaches facts about music, including rhythm, melody, expression, etc. Complete in 83 "45" and "78" non-breakable records that include 375 classical, modern, and folk music compositions. In 21 albums, available separately. Selected and organized by Lilla Belle Pitts, Professor Emeritus of Music Education, Teachers College, Columbia University; and Gladys Tipton, Professor of Education, Teachers College, Columbia University.

"a singing school"

Ten albums, available separately, for use as an aural complement to the basic music textbooks of the same name, published by C. C. Birchard & Company. These records (1) release teachers from the burden of demonstration; (2) expose children to examples of correct singing; (3) stimulate an interest in emulation, through the charm, intelligence, and warmth of performance. Artists are leading members of the Robert Shaw Chorale, highly trained in precision of tone, enunciation, versatility, and ensemble. These records are for group and individual teaching of music.

"Victrola" phonographs

records

WHERE OBTAINED: All RCA Victor educational and Red Seal records are sold through regular RCA Victor record dealers throughout the country. RCA Educational Services, in Camden, N. J., will be glad to assist all educators in selecting recorded material for school use.

45 rpm only



4Y511

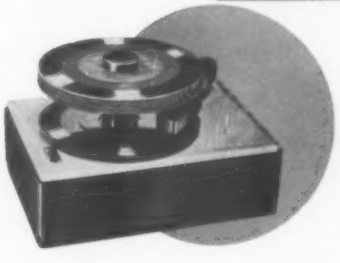
RADIO-PHONOGRAPH

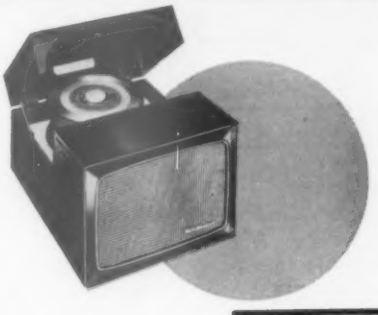
Low-priced table combination of RCA Victor AM radio and "Victrola" 45 phonograph, in a compact lightweight plastic cabinet occupying little more than ½ cubic foot space. Tuning dial in durable, bright gold trim, with controls beneath. Vibrant, clear "Golden Throat" tone. Built-in antenna. Maroon cabinet. AC. Height, 7"; Width, 10¾"; Depth, 12".

AUTOMATIC "45" ATTACHMENT

Big center spindle holds the simple, trouble-free changer. Feather-light tone arm causes less record wear. One control for on, off, reject. Long power cord. Plays up to fourteen 45 rpm records at the touch of the finger. Compact maroon cabinet. Plays through any TV, radio, or public address system. AC. Height, 7"; Width, 10¼"; Depth, 7¼".

45J2





45HY4

ORTHOPHONIC HIGH FIDELITY "45" TABLE PHONOGRAPH

45 records really come "alive" on this phonograph. 8" "Olson-design" curvilinear speaker, ceramic pickup, synthetic sapphire stylus and new power amplifier. Maroon plastic cabinet. AC. Height, 8⅜"; Width, 11½"; Depth, 13½".



3H561

3-SPEED ORTHOPHONIC LOW-BOY CONSOLE PHONOGRAPH

Opens from the top . . . no bending to change records . . . no straining to see controls. Sound is rich and full . . . you hear music with the life and sparkle of the original performance. Giant 12-inch "Olson-designed" curvilinear speaker, powerful high-fidelity amplifier, 3-speed automatic changer, ceramic pickup, synthetic sapphire stylii, acoustically designed cabinet. Modern rich mahogany finish and blond tropical hardwood. Provision for attaching companion speaker. AC. Height, 29¾"; Width, 29"; Depth, 17½".

folk dances

Sixteen records of traditional and familiar folk dances from America and 10 foreign lands, arranged for the enjoyment and participation of all ages and grades of school. Authentic tempos and orchestrations recorded by the RCA Victor Folk Dance Orchestra, Michael Herman, conductor. Each record is provided with fully illustrated dance instructions. Available as single records, at 45 and 78 rpm.

instruments of the orchestra

An album which provides the student with true aural recognition of instrumental tone colors, basic toward the appreciation of fine musical understanding, composition, and play. Charts of Instruments of the Orchestra available from J. W. Pepper & Son, 1423 Vine St., Philadelphia 2, Pa.

educational record catalog

A special 138 page educational record catalog includes all educational records as well as a coded section of Red Seal records to assist educators in selecting recordings of all types. Copies are available to Administrators and Teachers on request.

music America loves best catalog

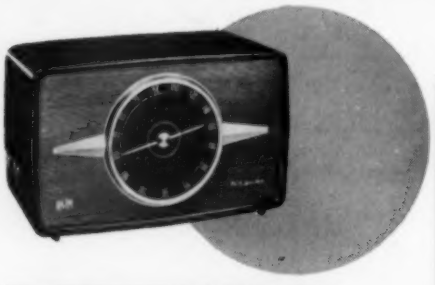
This is the general record catalog listing all classical and popular music available on RCA Victor records. Selections are listed by title, artists and composers. It is available through local RCA Victor record dealers, or from RCA Educational Services, Camden, N. J.

other record catalogs

RCA Victor issues many foreign recordings in more than a dozen languages, primarily of the popular type music. Many foreign language classes find such recordings useful as supplementary aids. Write to RCA Educational Services for catalogs.

radios

Only a few of the many models of radios are shown here. Write for brochure showing complete line for schools.

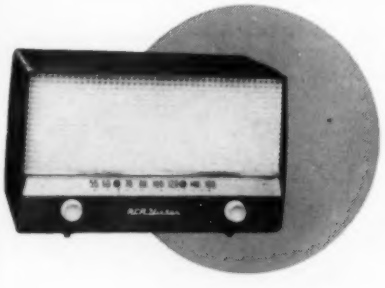


Woodland

Model 3RF91—AM-FM. RCA Victor's finest table radio. Truly deluxe reception and rich full "Golden Throat" tone . . . plus double listening pleasure—on AM or static-free FM. Giant 8-inch speaker, continuously variable tone control. Built-in phono-socket. Handsome maroon plastic cabinet with front in soft taupe. Gold-colored dial and trim. AC. Height, 9⅞"; Width, 16¼"; Depth, 9".

Model 4X641—AC-DC. Extra-powerful performance plus luxury styling and tone. Gives finer radio performance even in difficult reception areas. Outstanding value at modest price. Superb "Golden Throat" tone. Phono-socket. Color style in six brilliant decorator color combinations. AC-DC. Height, 7"; Width, 11¼"; Depth, 7".

Driscoll





Slumber-King

Model 5C591—Clock-Radio. Completely automatic servant: automatically switches to pre-selected wake-up station at desired time, at pre-set volume, morning after morning if setting is unchanged; shuts off after you get to sleep, wakes you at desired time, turns on appliances, accommodates phonograph, tape recorder, etc. Radio has "Golden Throat" tone for finest sound. Stunning modern cabinet in rich gray and black plastic with gold-color trim. AC. Height, 8¼"; Width, 10⅞"; Depth, 7". Many other models.

television

WHERE OBTAINED: All television receivers are sold through regular RCA Victor Television dealers throughout the United States. Such dealers will be glad to demonstrate these and many additional models for you, and quote you school prices.



Arlen

21-inch Super Model 21S-503—table model. Power-packed. New Aluminized "All-Clear" picture tube and new "Magic Monitor" chassis give brilliant viewing. "Easy-See" tuning dial with signal light makes dial visible across the room. Phono-jack. 3-position tone control. Smart ebony finish. Height, 22⅞"; Width, 23½"; Depth, 25½".

21-inch Super Model 21S-518—low priced console. "Aluminized" All-Clear picture tube. "Golden Throat" Fidelity tone for fine listening. Graceful Contemporary design in grained mahogany or grained limed oak. Height, 37"; Width, 25½"; Depth, 23¾".

Trafton





Baylor

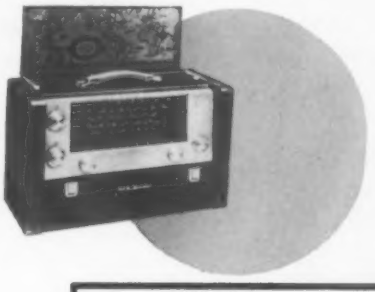
24-inch Super Model 24S-512. Aluminized "All-Clear" picture tube, illuminated "Easy-See" tuning dial. Personalized tone control. Phono-socket. Distinctive cabinet in dark finish. Ideal for classroom viewing because of 24-inch tube.

WHERE OBTAINED: All radios are sold through regular RCA Victor Radio and Television dealers throughout the United States. Such dealers will be glad to demonstrate these and many additional models for you, and quote you school prices.

Model 4X661—AM plus Short Wave. Modern table radio that adds new interest and pleasure to radio listening. Sensitive AM reception . . . plus powerful international short wave reception for the foreign language classes. Styling has fresh, new appeal. Tone is rich and full with famed "Golden Throat." Convenient phono-socket. Gleaming black plastic with gold-color trim. AC-DC. Height, 7"; Width, 11¼"; Depth, 7".

Leighton





Strato-World

Model 3BX671—7-band portable. Spans oceans and continents in seconds with powerful, sensitive reception. AM and 6 short wave bands. Separate treble and bass controls. Spare tube rack. Electrical band spread tuning. Compensator restores normal reception in low line-voltage areas. World time zone map. "Climatized" against weather extremes. AC, DC or battery. 220 volt adapter available. Genuine top-grain cowhide leather with durable plastic ends, or genuine cowhide in alligator finish. Height, 10⅜"; Width, 17½"; Depth, 7¾".

Model 2BX63—AC, DC, battery portable. Power-plus portable is a top choice with travelers everywhere . . . pulls in stations beyond normal "portable range." "Golden Throat" clear, rich tone. Trim and deluxe in dove-gray plastic with comfortable leather carrying handle. AC, DC, or battery. Height, 8¼"; Width, 12½"; Depth, 6½".

Globe Trotter



-inch Super Model 24S-529 Console. ntrols with "Easy-See" dial with King-e numbers for ease of tuning. Peak pic-e performance. "Golden Throat" Fidelity nd system includes 10-inch speaker. Ma-ogany grained, or limed oak finish. Height, ¾"; Width, 29⅛"; Depth, 24⅛".

Brentwood



RCA PIONEERED AND DEVELOPED COMPATIBLE COLOR TELEVISION

In television, compatibility means that colorcasts can be received in color on color-tv sets, and in black-and-white on black-and-white sets. It also means that color-tv sets can receive black-and-white programs in black-and-white. The RCA Compatible Color Television System protects present investment in black-and-white television by making it possible to receive color telecasts in black-and-white without any new installations, or added costs.



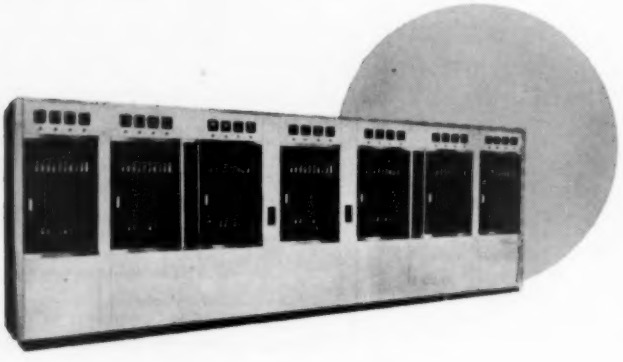
21CT55

color television

RCA Victor, first in television since its beginning, now brings a magnificent combination of superb color television and superior black-and-white . . . in one great 21-inch set. RCA Victor engineering skill and production know-how have been combined to create the very finest television receiver . . . new realism . . . vivid life-like color . . . truly a new dimension in accurate portrayal.

transmitters

RCA Transmitters and associated equipment
sold directly from this company. Let us know yo
plans and requirements, and we will be pleased
recommend the best equipment for your nee
Write for brochure on educational television s
tion costs.

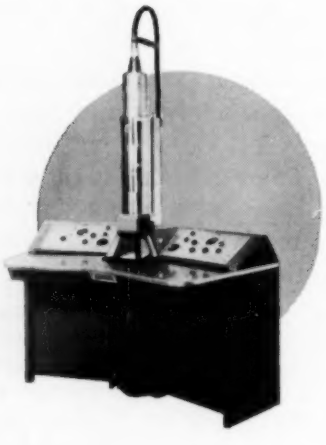


RCA's complete line of Radio and Television Broad
Equipment includes everything necessary for AM, FM
TV . . . from antenna, transmitter and studio equip
to classroom receivers.

RCA is the leading supplier of radio and telev
broadcasting equipment to the commercial and educa
field. RCA field engineers will be glad to help you
formulating your radio or television broadcasting eq
ment plans.

electron microscope

RCA Electron Microscopes are invaluable in a
field where magnification of optical microscope
simply not enough. They have opened up n
avenues of research in the fields of chemis
metallurgy, medicine, bacteriology and biolo
All equipment sold directly from RCA; write
additional information.



The RCA Type EMU-3A Electron Microscope is a po
ful research tool which permits detailed study of parti
structures, and minute materials which are too small t
seen by other methods. Unusually flexible, the EMU
provides the high resolution, high magnification microsc
necessary to meet most diverse research requirements
science and industry. A less expensive model, the EMU-
is also available.

The Type EMU-3A is a self-contained, vertical col
electron microscope . . . completely new, functionally
signed and built to afford a wide degree of flexibility
convenience of operation. The optical system is based
the world-famous electron optic design of the RCA E
series of electron microscopes. Numerous improvement
design changes have been made to keep pace with
progress of electron microscopy. Push buttons and to
switches automatically control many functions which
to be performed mechanically in earlier instruments
the microscopist is now able to concentrate completely
the specimen.

features

• 20 Angstrom unit resolution. • Variable direct magnification from 1400X to 30,000X. • Photographic enlargements to 200,000X. • Large direct viewing screen. • Selected area diffraction. • Automatic vacuum valving. • Extremely resistant to vibration and magnetic fields. • Rear focal point objective aperture externally adjustable or removable. • Electrostatic compensation.

magnification

The EMU-3A utilizes both a 50 KV and 100 KV pow
permitting ample penetration and adequate protection
even the most fragile specimens. The power supply
electron gun are completely enclosed and will ope
satisfactorily at any altitude.

Direct magnification from 1400X to 30,000X. Ph
graphic enlargements to 200,000X.

test equipment

low are representative items from our complete e of Test equipment. Other types of equipment ilable include Marker Generators, TV Sweep erators, Battery Testers, UHF Sweep Genera- rs, Microammeters, and accessories of all types.

WHERE OBTAINED: RCA Test Equipment is sold through authorized RCA Test Equipment Distributors. We will gladly supply the name and address of your nearest distributor.

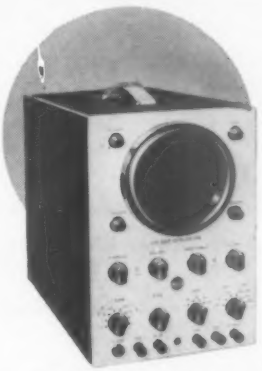
senior voltohmyst



WV-97A Features a high-impedance, high-frequency, full-wave signal rectifier for direct readings of peak-to-peak voltages up to 4200. With this Senior Voltohmyst you can readily obtain quantitative measurements of practically all important complex-waveform voltages found in video, sync, and deflection circuits. Has high input resistance, electronic protection against burnout, zero-center scale, 200 microampere meter movement, and ±1% ple resistors.

- Directly measures complex waves from 0.2 volt to volts peak-to-peak.
- Measures dc voltages from 0.02 volt to 1500 volts.
- Measures rms values of sine-wave voltages from 0.1 to 1500 volts.

5″ oscilloscope



WO-88A Combines all the essential features required for TV servicing. Built-in voltage calibrating facilities permit simultaneous waveshape display and peak-to-peak voltage measurements. Sync polarity may be reversed instantly by simply clicking a front-panel switch. Matched high-impedance probe gives the "88" an overall input resistance of 10 megohms and an input capacitance of less than 10_{uu}f.

- Frequency response flat within —3 db from 0 to 500 Kc, useful to 1.0 Mc.
- Direct-coupled vertical amplifier.
- 5″ Cathode-ray tube with magnetic shield.
- 60-cycle sweep with wide angle phasing control.
- 1-volt peak-to-peak calibrating voltage.
- Quick "recovery" time, freedom from line "bounce."

udio signal generator

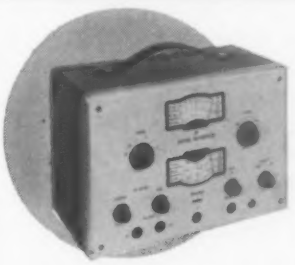


WA-44A Excellent for use in measuring: inter-modulation distortion in amplifiers; amplifier frequency response; frequency response of tone controls; frequency response of phonograph equalizers; input and output impedances of amplifiers; resonant frequency of loud-speakers; speed of ter/reproducer mechanisms. Continuously tunable 11 cps to 100 Kc.

ally useful for: tuning bass-reflex enclosures; deter- ng unknown audio frequencies; determining resonant ency of LC circuits.

- RC-type oscillator has wide frequency range . . . ures checking of hi-fi amplifiers.
- Delayed agc circuit insures output uniform within db over entire frequency range. (Reference frequency 00 cps.)
- Frequency stability of ±3% or better.
- Separate high and low output terminals, 15V rms or 2.5V rms max.
- Hum level 0.1% of maximum output.

rf signal generator



WR-49A Lightweight. Can be depended upon in such applications as alignment and signal tracing of AM and FM radio receivers, alignment of low-frequency if amplifiers in TV receivers. Continuously tunable from 85 Kc to 30 Mc.

You can inject rf signals into plate circuits and other points where dc is present without placing a dc load on circuit under test . . . with protection from burn-out in both equipment and signal generator.

- Cathode-follower output stage isolates oscillator from effects of load reactance and resistance, thereby maintaining good output waveform, voltage regulation, and frequency stability of the oscillator.
- Functional-design dial facilitates accurate, easy readings.
- Full-length shielding of output cable minimizes radiation and hum pickup.
- Built-in dc blocking capacitors.
- Built-in 400-cycle oscillator for internal or external use.

air conditioners

RCA Air Conditioners are applicable to, and in use in, many schools, especially in the Administrative and Business Offices. They feature push button controls, permanent filters, and a 5-year warranty on the entire cooling system.

WHERE OBTAINED: These and other models of RCA Air Conditioners are sold through regular RCA Victor dealers throughout the country. They will be glad to discuss your needs.

"fifty"

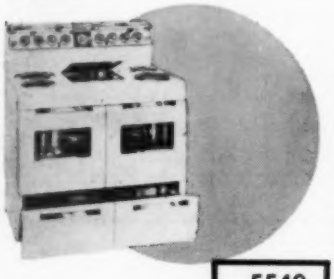


ONE-HALF HORSEPOWER. For medium-size rooms up to 325 square feet. Thermostat built in on this attractively styled unit. 13-11/16" high; 22-⅜" wide; 26-¾" deep. Extends only 10-11/32" into room.

Estate ranges

RCA Estate Ranges have met the needs of all Home Economic classes, whether large or small. They are designed for long life and hard usage. All models feature Super-size ovens, "Insulizer" walls, one-piece top, balanced heat oven, and divided cooking top.

electric



5540

Grills, bakes, barbecues. 2 full-size ovens, each with radiant broiler, one with Bar-B-Kewer. Oven lights and windows. Converto-Grid. Controls on mantel back. Tel-U-Lite for each unit. 4-way automatic clock with Minute Alarm controls right oven, Bar-B-Kewer, appliance outlet and left rear unit.

DIMENSIONS, in. Oven: 16-½ x 19-¾ x 15-½. Bar-B-Kewer Meat Oven: 16-½ x 19-¾ x 15-½. Oversize utensil drawer: 15 x 18-⅝ x 13. Utensil drawer: 15 x 18-⅝ x 8-½. Converto-Grid: 11-9/16 x 12. Height to cooking top, 36. Height to top of low mantel back, 44-⅛. Height to top of high mantel back, 48-⅜. Floor space required, 40 x 26-⅝.
UNIT WATTAGES. Left front unit, 1450. Right front unit, 2100. Left rear unit, 2100. Right rear unit, 1450. Converto-Grid, 2100. Ovens: top unit, 950; bottom unit, 3000. Broiler, 3000. "In-oven" Bar-B-Kewer, 750, Bar-B-Kewer meat oven, 3000. Total connected load, 19.2K.



5512

Space King. Automatic electric clock turns oven on and off, controls timed appliance outlet. One-hour Minute Alarm in clock. Radiant high broiler in "super-size" oven. Disposa-Bowls catch grease.

DIMENSIONS, in. Oven: 24 x 19-¾ x 15-½. Height to cooking top, 36. Maximum height, 48-⅜. Utensil drawer, 23-¼ x 19 x 9. Floor space required: 30 x 27-½.
UNIT WATTAGES. Left front unit, 1450. Right front unit, 2100. Left rear unit, 2100. Right rear unit, 1450. Top balanced heat bake unit, 950. Broiling unit, 3000. Bottom oven unit, 3000. Total connected load, 11.7 K.

school range plan:

RCA Estate has available a special school plan whereby educational institutions can obtain any model range at a special educational price. Write Educational Services, RCA, Camden, N. J. for details.

RCA tubes

RCA manufactures a complete line of all types of electron tubes—receiving, transmitting, power, cathode ray, special purpose. Detailed information on any or all types will be sent on request. They are sold through RCA Tube distributors, whose location will be supplied on request.

"one hundred"

ONE HORSEPOWER. Most powerful of the window units, this big-capacity model is engineered for rooms as large as 620 square feet. Built-in Thermostat. Concealed Panel Light. 15-17/32" high; 26-9/32" wide; 28-15/32" deep. Extends only 14-5/32" into room.

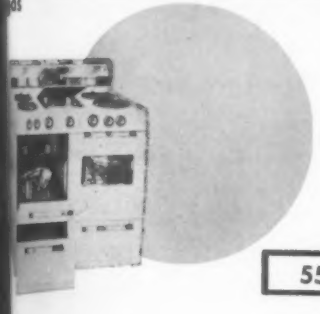


"console 100"

ONE HORSEPOWER. A high-power unit of clean contemporary design for rooms up to 620 square feet. Attractive finish in blond, mahogany or steel. Equipped with Thermostat for temperature control. 38-¼" high; 37" wide; 20-½" deep.

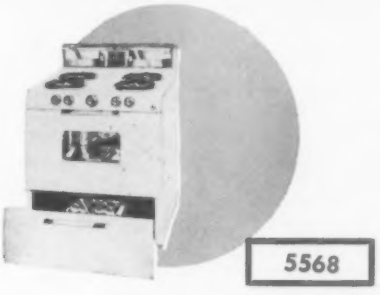


Gas



5591

Grills, bakes, barbecues. Balanced Heat Bake Oven has light, and "eye-angle" window. Bar-B-Kewer Meat Oven includes smokeless radiant high broiler. Hide-Away Grid-All has hinged cover to restore center work space. Chrome mantel back. Electric clock with 4-hour Minute Alarm. Two appliance outlets. Storage drawer. Fluorescent top lamp. Pots-a-Bowls.
DIMENSIONS, in. Oven: 16-½ x 19-¾ x 15-½. Gas connection, ¾. Floor space required: 40 x 27-½.
BTU RATINGS, (CITY GAS AT NORMAL ALTITUDE) Standard top burner, 9000. Giant top burner, 12000. Hide-Away Grid-All burner, 12000. Bar-B-Kewer, 14000. Bake oven, 20000. All models available for city or LP (bottled) gas.



5568

Space King. Built to CP standards. Automatic clock turns oven on and off, and controls the timed appliance outlet. One-hour Minute Alarm in clock. Smokeless broiler features exclusive Fingerlift control.
DIMENSIONS, in. Oven: 24 x 19-¾ x 15-½. Height to cooking top, 36. Maximum height, 44-⅛. Gas connection, ¾. Floor space required: 30 x 27-½.
BTU RATINGS, (CITY GAS AT NORMAL ALTITUDE) Standard top burner, 9000. Giant top burner, 12000. Oven and broiler, 25000. All models available for city or LP (bottled) gas.

For further information

Please use attached Business Reply Card for more specific information concerning any product in this catalog. Or simply write to Educational Services, Radio Corporation of America, Camden 2, N. J.

PRODUCT LITERATURE

This catalog can only give a broad picture of the many audio-visual and other aids RCA provides for educational use. Only a few types and models of many items are shown here. More complete literature is available on request for each type of equipment. A business reply card is enclosed for your convenience when requesting this additional information and data.

RCA EDUCATIONAL SERVICES

RCA Victor has maintained an Educational Service since 1911 to assist educators in the selection of audio-visual aids for school use. This free service is available at all times on request. Its members are completely familiar with school needs and developments in this field, and will be pleased to help in the solution of your problems.

RCA FIELD SALES ENGINEERS

RCA maintains a staff of field engineers working from strategic regional offices throughout the country. These engineers are experts in problems relating to sound, visual, and communication type equipment, as well as in their installation and service. They are available on request for consultation and discussion concerning your use of these types of equipment.

educational services
RADIO CORPORATION OF AMERICA
Camden · New Jersey

FORM ASU-55

TMKS ®

LOUDSPEAKERS BY *University*

a complete line for every commercial sound and public address need

REFLEX TRUMPETS

for directional sound projection



Pioneered by University, the most efficient modern method of sound distribution.

- Economical—More sound output for less amplifier power.
- Ruggedly constructed—weatherproof . . . install it and forget it.
- Five trumpet sizes to cover varied response and coverage requirements.

MODEL	GH	LH	PH	SMH	4A4**
LOW FREQUENCY CUTOFF	85 cps.	120 cps.	150 cps.	200 cps.	200 cps.
SOUND DISTRIBUTION	65°	75°	85°	95°	80 degs.
AIR COLUMN LENGTH	6½ ft.	4½ ft.	3½ ft.	2½ ft.	2½ ft.
BELL DIAMETER	30⅞″	25⅝″	20¼″	16⅛″	16⅞″
*HORN LENGTH	27⅞″	19″	15¾″	12″	20½″
*LIST PRICE	$65.00	$44.50	$31.00	$26.00	$93.00

Less Driver Unit
***This model takes 4 drivers—produces 100 watts.*

RADIAL REFLEX PROJECTORS

for uniform dispersion in all directions



- Reduces the total number of loudspeakers required to cover a given area.
- More efficient—driver-driven radial speakers provide as much as 500% greater output than cone speaker radials.
- Versatile—ideal for spacious areas necessitating suspension installation, such as hangars, church towers, warehouses, etc. Suitable for voice and music.

MODEL	RLH	RPH	RSH
LOW FREQUENCY CUTOFF	120 cps.	140 cps.	180 cps.
SOUND DISTRIBUTION	360°	360°	360°
AIR COLUMN LENGTH	5 ft.	4 ft.	3 ft.
BELL DIAMETER	28⅛″	25⅛″	18⅞″
*OVERALL HEIGHT	18½″	14″	11″
*LIST PRICE	$59.00	$45.00	$38.50

Less Driver Unit

FOR WIDE ANGLE HORIZONTAL DISPERSION



The New COBREFLEX-2

Meets every requirement for:

- Paging and Talk-Back installations
- Heavy industry applications
- Fixed or Mobile systems
- 2 or 3 way hi-fi systems

Heavy-duty design provides wide angle dispersion of sound. Use with any University drive 1-pc. die-casting.



NEW!



CMIL **CIB**

Provide moderate power with maximum intelligibility and wide angle dispersion pattern. Built-in hermetically sealed driver. In 4, 8, and 45 ohms. CIB 12 watts, CMIL 3 watts.

See specs below.

PAGING AND TALK-BACK SPEAKERS

for maximum penetration through areas with high noise density.



MODEL IB8
High efficiency provides maximum coverage with minimum power. Features high power capacity . . . high sensitivity . . . rising frequency characteristics.

MODEL MIL
For installations requiring concentrated power to cover small areas. High conversion efficiency conserves amplifier power, ideal for low level systems.

MODEL MIS
Designed for flange or flush mounting in cabinets, walls, ceilings, bulkheads, etc. Ideal for replacement of cone speakers to increase output.

MODEL IBR
Small radial speakers, complete with built-in driver unit. Affords 360° horizontal dispersion resulting in wide coverage with a minimum of speakers.

MODEL CR
Reflex speaker conservatively rated at 20 watts continuous duty, and featuring built-in driver unit. Excellent tonal balance for music.

FOR BI-DIRECTIONAL COVERAGE



Model 2W25

- Covers two opposite areas with a single driver unit (driver supplied).
- Reduces installation and equipment costs.
- Versatile bracket arrangement provides 4 different mounting positions.
- Built for continuous heavy duty service.

MODEL	IB8	MIL	MIS	IBR	CR	2W25	CMIL	CIB	Cobreflex-2
Cont. Power	12 watts	3 watts	3 watts	12 watts	20 watts	25 watts	3 watts	12 watts	Dependent on University Driver Unit used.
Impedances	8 ohms	8 ohms	8 ohms	8 ohms	16 ohms	16 ohms	8 ohms	8 ohms	
Frequency	300-13,000	400-13,000	500-13,000	300-10,000	250-6000	350-6000	400-13,000	300-13,000	
Dispersion	90°	120°	150°	360°	90°	120° each horn	120° x 60°	120° x 60°	120° x 60°
Dimensions	8½″ dia., 9″ high	6⅜″ dia., 7″ high	3⅞″ deep, 5½″ O.D., 4⅞″ mt. dia.	12 3/32″ dia., 10 3/32″ high	11½″ dia.	20½″ lg. bell 8½″ dia. mouth	6 7/32″ high 9½″ wide 8 7/16″ long	7⅜″ high 14″ wide 12″ long	10¼″ lg. bell, 18½″ x 9¼″ mouth
List Price	$32.50	$25.00	$21.50	$39.00	$42.00	$48.00	$28.75	$40.00	$35.00
4Ω	$34.00	4Ω $26.25	4Ω $22.75			(inc. driver)	4Ω $30.00	4Ω $42.00	
45Ω	$34.00	45Ω $26.25	45Ω $22.75				45Ω $30.00	45Ω $42.00	

UNIVERSITY LOUDSPEAKERS, INC. • 80 SOUTH KENSICO AVE. • WHITE PLAINS, NEW YORK

West Coast prices slightly higher.

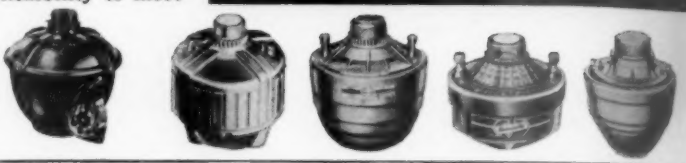
RELIABLE RUGGED DRIVER UNITS

with these exclusive built-in features

- W-shaped Alnico 5 magnet results in maximum efficiency by reducing reluctance losses and surface leakage.
- Built-in transformers provide installation flexibility to meet any impedance and constant voltage system requirement.
- Bi-sectional mechanism with foolproof automatic "rim-centered" diaphragm voice coil assembly assures immunity to shock and vibration.
- Full selection to meet all power, frequency response, impedance and mechanical requirements.

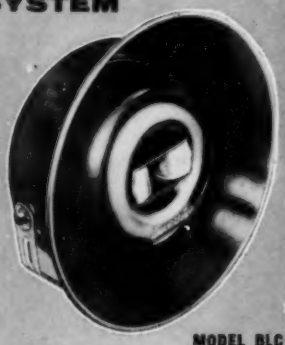
University LOUDSPEAKERS

are **APPLICATION ENGINEERED** *to provide optimum performance with maximum economy.*



MODEL	PA-30	SA-30	SA-HF	MA-25	T-30
Continuous Power	30 watts	30 watts	25 watts	25 watts	20 watts
Frequency Response	80-10,000 cps.	90-10,000 cps.	90-10,000 cps.	90-6000 cps.	250-15,000 cps.
Voice Coil Impedance	16 ohms	16 ohms	16 ohms	16 ohms	8 ohms
Transformer Impedances	165/250/500/ 1000/2000 ohms	45/165/250/500/ 1000/2000 ohms	—	—	—
Constant vol. sys. pwr.	30-20-10-5-2½ watts	30-20-10-5-2½ watts	—	—	—
Diameter, Overall	6¾"	5"	4½"	4⅛"	3½"
Length, Overall	6¾"	6¾"	5"	3¾"	3⅞"
List Price	$50.00	$45.00	$35.00	$27.50	$27.50

WIDE RANGE WEATHERPROOF COAXIAL SYSTEM



MODEL BLC

designed to simplify indoor and outdoor "high quality" sound installations.

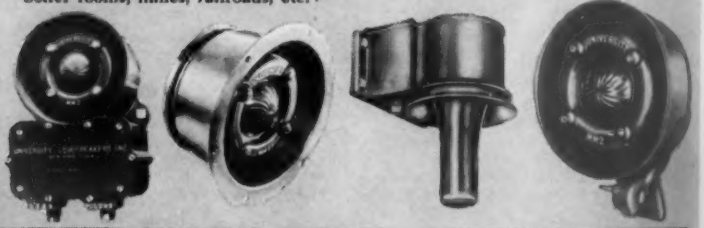
Two versions of a fine speaker system . . . both offering the finest reproduction found in P.A. The WLC Theatre System has successfully proven itself in deluxe stadium and outdoor theatre installations. The BLC, a smaller, more compact version, is excellent for general application in public address work. Both units feature separate drivers for the woofer and tweeter sections.

MODEL	BLC	WLC
Power Cap.	25 w	30 w
Imped.	8 ohms	8 ohms
Resp.	70-15,000 cps.	50-15,000 cps.
Disp.	120°	90°
Diam.	22½"	33½"
Depth	9"	20"
List	$75.00	$250.00

SUBMERGENCE PROOF SPEAKERS

immune to salt spray, gases, live steam, fungi, and all harmful dirt and dusts.

Designed to U. S. Navy submergence specs . . . provide reliable uninterrupted service with negligible maintenance under the most gruelling conditions. Numerous commercial and industrial applications: docks, bridges, boiler rooms, mines, railroads, etc. .



MODEL	MM-2TC	MM-2F	MSR	MM-2
Continuous Power	15 watts	15 watts	15 watts	15 watts
Impedance	16 ohms	16 ohms	16 ohms	16 ohms
Dispersion	120°	150°	360°	150°
Frequency	300-6000 cycles	300-6000 cycles	250-6000 cycles	300-6000 cycles
Dimensions	12" high 4⅛" depth 6¼" wide	7¼" O.D. 3¾" depth 6⅝" mtg. hole dia.	10¾" high 8¼" depth 7¾" wide	6" O.D. 4¾" depth
List Price	$65.00	$40.00	$65.00	$42.00

WEATHERPROOF LINE MATCHING TRANSFORMERS

Designed to afford maximum utility in application and utmost convenience of installation . . . assure perfect performance throughout the entire audio spectrum.

MODEL CTR-20



PRIMARY IMP.	45, 500, 100, 1500, 2000 ohms
SECONDARY IMP.	4-8-16 ohms
POWER HANDLING	cap. 25 watts
SHIPPING WEIGHT	3 lbs.
LIST PRICE	$15.00

Model 5420—Same as above, but for indoor use; strap mtg. List $6.00

ADAPTERS



WEA Adapter
Adapts WE and RCA Horns for use with any University driver. List $2.50



2YC Connector
Used with two driver units, provides to 60 watts for any trumpet or projector. List $10.00



PMA Adapter
For mounting University "U" bracket speakers on standard ½" pipe. List $1.50

EXPLOSION PROOF SPEAKERS

designed for hazardous duty

MODEL 7101-7102



Only complete loudspeakers approved by Underwriters' Laboratories for use in locations where flammable liquids, gases, dust and other combustibles are present.

Model 7101—for Class I, Groups C and D. $125.00 list.

Model 7102—for Class I, Groups C and D, and Class II, Groups E, F and G ..... $150.00 list.

Cont. Power	25 watts
Voice Coil Impedance	16 ohms
Transformer Impedance	45, 500, 1,000 1500, 2,000 ohms
Frequency	200-10,000 cps.
Dispersion	95°
Dimensions	19" length 15¾" height

UNIVERSITY LOUDSPEAKERS, INC. • 80 SOUTH KENSICO AVE. • WHITE PLAINS, NEW YORK

Value-designed . . .

Quality-engineered . . .

University

LOUDSPEAKERS

FOR THREE-WAY PERFORMANCE

TRIAXIALS

by **University**



The 1 and only 8" Triaxial Speaker—Model 308

No other speaker like it! An 8" 3-way speaker—ideal for hi-fi installations where space is at a premium and quality is not to be compromised. Response down to better than 50 cycles, provided by voice coil and diaphragm operated with the exclusive University Alnico-5 "W" magnet. Rich, full-bodied mid-range is achieved through the use of the patented "Diffusicone" section of the unit, crossing over at 1,000 cycles. The high frequency reproducer, a compression driver unit wide angle tweeter which extends to 15,000 cycles, crosses over electrically at 5,000 cycles.



It's 2nd To None—The Model 312 Triaxial

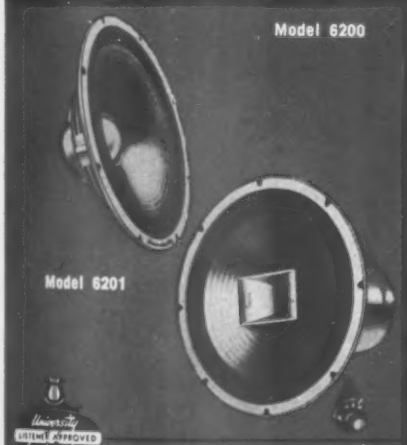
A new advance by University in the 12" field. Full range response from 40 cycles to inaudibility. Employs the "Diffusicone" principle for full-bodied mid-range and the HF-206 Super Tweeter for clean, brilliant highs. Built-in L/C network and "balance" control permit you to adjust tonal quality to your own listening tastes. All-Alnico-5 exclusive University "W" magnet and duraluminum voice coil suspension in woofer section results in deep and highly efficient bass response.

It's A 3-Way Wonder—Model 315 Triaxial

Reproduces the entire range, from 30 cycles to inaudibility with such amazing clarity and presence that the superiority of this unit is readily obvious. Built around the sensational C15W woofer assembly, mid-range is provided by the patented "Diffusicone" device, while the clean and brilliant highs are reproduced by a compression driver unit with wide angle horn through an L/C electrical network crossing over at 5,000 cycles.



MODEL	308	312	315
Frequency Response	50-15,000 cycles	40 cycles to inaudibility	30 cycles to inaudibility
Power Capacity	25 watts integrated prog.	25 watts integrated prog.	50 watts integrated prog.
Impedance	8 ohms	8 ohms	8 ohms
Baffle Opening	6½" diameter circle	10½" diameter circle	13½" diameter circle
Crossovers	1000 cycles (mechanical) 5000 cycles (electrical)	1000 cycles (mechanical) 5000 cycles (electrical)	1000 cycles (mechanical) 5000 cycles (electrical)
Control		high frequency, wired & supplied with 36" cable	high frequency, wired & supplied with 36" cable
Dimensions	8 7/32" dia. — 6¼" depth	12⅛" dia. — 8" depth	15½" dia. — 12" depth
Mounting	8 equally spaced holes on 7⅝" dia. circle	8 equally spaced holes on 11 5/16" dia. circle	8 equally spaced holes on 14 1/16" dia. circle
Shipping Weight	5 lbs.	12 lbs.	34 lbs.
List	$60.00	$96.00	$220.00



Model 6200 Extended Range Speaker

The Model 6200 is ideal for improvement of commercial-type radio and phono-combinations, for high quality P.A. and for sound reinforcement in restaurants, night clubs, churches, schools, hospitals, stores, etc. High efficiency of this speaker requires only a fraction of the audio power needed for ordinary 12" loudspeakers. Specially shallow overall depth is perfect for flush ceiling or wall mounting and other tight places.

Response 45-10,000 Cps
Power Capacity 30 Watts
Impedance 8 Ohms
Baffle Opening 10½" Dia. Circle
Dimensions 12⅛" Dia.—4 13/32" Depth
Shipping Weight 5 lbs.
Mounting 8 Equally Spaced Holes on 11 13/32" Diameter Circle

$35.00 list

Model 6201 Dual-Range Coaxial Speaker

The 6201 is acknowledged as the industry's finest value in a high quality 12" loudspeaker. It is a true dual range coaxial system which reduces intermodulation distortion. The "Reciprocating Flare" horn tweeter is driven by a separate high frequency driver for greater high frequency output, plus built-in inductance/capacitance crossover network complete with variable "balance" control wired to 36" of connecting cable . . . the only such speaker in its price class. A completely engineered package.

Response 45-15,000 Cps
Power Capacity 25 Watts
Impedance 8 Ohms
Baffle Opening 10½" Dia. Circle
Dimensions 12⅛" Dia. — 8¼" Depth
Mounting 8 Equally Spaced Holes on 11 13/32" Diameter Circle
Shipping Weight 7 lbs.

$75.00 list



The Diffusicone 8 and 12—Wide Range Speakers . . . at amazing low cost

University Diffusicone (patented) speakers bring within every music lover's grasp the endless pleasures of true concert hall quality reproduction without need for undue concern over speaker location. Exclusive "Diffusicone" design results in full fidelity anywhere in the room . . . full undistorted response, without loss of highs at listening points progressively off speaker axis.

MODEL	Diffusicone-8	Diffusicone-12
Frequency Response	70-13,000 cps. uniform field pattern	45-13,000 cps. uniform field pattern
Power Capacity	25 watts	30 watts
Impedance	8 ohms	8 ohms
Dimensions	8 7/32" dia.—3⅜" depth	12⅛" dia.—4¼" depth
Baffle Opening	6½" dia. circle	10½" dia. circle
Mounting	8 equally spaced holes on 7⅝" dia. circle	8 equally spaced holes on 11 13/32" dia. circle
Shipping Weight	5 lbs.	6 lbs.
List	$35.00	$45.00

Proven By Years Of Experience

UNIVERSITY LOUDSPEAKERS, INC. • 80 SOUTH KENSICO AVE. • WHITE PLAINS, NEW YORK

University Loudspeakers — Style and Craftsmanship — Quality

The whole is equal to the quality of its parts

TWEETERS . . . by University

WHATEVER THE PROBLEM . . .

- CROSSOVER
- IMPEDANCE
- RESPONSE
- POWER CAPACITY
- DISPERSION
- COST

NEW! MODEL HF-206 SUPER TWEETER
High frequency response for beyond audibility. Super-efficient high output driver and horn assembly using "reciprocating flares" principle. Suitable for crossover 3500 cycles or above. **Dispersion 120° x 60°, 8 ohms impedance.**
$45.00 list



MODEL 4408
For wide range reproduction in moderate power systems requiring a crossover down to as low as 600 cycles. Heavy, resonant-free horn casting. **Dispersion 120° x 60°, 8 ohms impedance.**
$30.00 list



MODEL COBREFLEX/T-30
For use in 2- or 3-way systems when crossover as low as 350 cycles is desired. Exclusive die-cast dual wide angle horn. **8 ohms impedance.** Will handle high power. **$62.50 list**



MODEL 4401 TWEETER
Uses "reciprocating flares" wide angle horn and bonafide compression driver. Exceptional performance at modest cost. **8 ohms impedance,** suitable for crossover down to 2000 cps. **$25.00 list**



MODEL 4402 WIDE ANGLE DUAL TWEETER
Electrical and acoustical characteristics make it the most versatile high frequency tweeter available. Driver can be connected for use in **4-8 and 10-16 ohm systems.** Dispersion pattern variable with interconnection of drivers. High power capacity. For 2000 cycle crossover or above. **$40.00 list**



MODEL 4409
A heavy duty version of Model 4408 to handle the full, undistorted power of 25-40 watt amplifiers in 2-way systems, and 50 watts in 3-way systems.
$40.00 list



WOOFERS . . . by University

nothing like this in bass before!



MODEL C15W

15" DUAL IMPEDANCE RANGE SUPER WOOFER

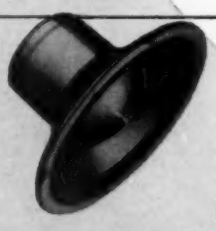
Acme of attainable perfection in the specific reproduction of low frequencies. Two spiders for positive piston action. Greatest axial voice coil depth and excursion—Six lb. Alnico 5 magnet. Die-cast girder construction for lifetime—trouble-free operation. Adjustable voice coil permits match to **4-8 ohms and 10-16 ohms.** Defies obsolescence. **For 50 watt systems.** **$125.00 list**

12" ADJUSTABLE RESPONSE WOOFER



MODEL C12W

Contains exclusive built-in facilities for limiting high end response to 700, 2000 or 5000 cycles, thus suiting crossover requirements of most tweeters. **8 ohms impedance, 30 watts power capacity.** **$55.00 list**

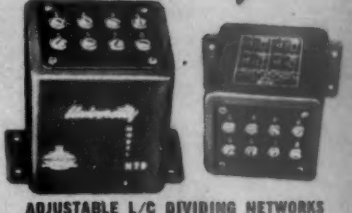


MODEL C8W

8" LOW FREQUENCY REPRODUCER

Ideal for assembling a compact, limited space, high quality system . . . perfect too, as mid-range unit in low cost three-way system. Can also be used in multiples as expanding woofer. **8 ohms impedance, 25 watts power capacity.**
$22.50 list

ADJUSTABLE SPEAKER NETWORKS . . . by University



N2A M2B

ADJUSTABLE L/C DIVIDING NETWORKS

As 2-way network:

MODEL N-2A		MODEL N-2B	
Impedance	Crossover Selections	Impedance	Crossover Selections
8 Ohms	350,700	8 Ohms	1250, 2500, 5,000
16 Ohms	350,700	16 Ohms	2500, 5000
4 Ohms	700	4 Ohms	2500
List	$30.00	List	$20.00

These units can be used singly as 6db/oct 2-way L/C networks, singly as 12db/oct L/C filters, in pairs as 12 db/oct 2-way networks and in combination as 3-way networks.

MODEL N-3 THREE-WAY CROSSOVER NETWORK
Complete with built-in continuously variable "presence" and "brilliance" controls. For 8 ohm 3-way systems using 350 and 5000 cps crossovers. Adjustable mounting arrangements. **$40.00 list**



MODEL N-1 ADJUSTABLE HIGH PASS FILTER
Built-in continuously variable high frequency control. Matches 16 ohms to 1250, 2500, 5000 cycle crossover; 8 ohms to 2500, 5000, 10,000 cycles; 4 ohms to 5000 and 10,000 cycles.



$15.00 list

UNIVERSITY LOUDSPEAKERS, INC. • 80 SOUTH KENSICO AVE. • WHITE PLAINS, NEW YORK

Form 78N77-ASU-13.5M/11.5M AD-4/55-PP

Printed in U.S.A.

CALIFONE CORPORATION

1041 N. Sycamore Ave., Hollywood 38, Calif.



5J — $59.95 Plus Excise Tax

A 3-speed portable with full rich tones and ample volume for a large classroom.

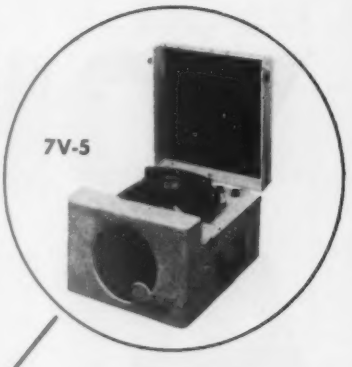
- Wide range tone control
- Plays 7"-12" records with lid closed
- 8" 3.2 oz. Alnico V speaker
- New ceramic cartridge
- Output jack for external speaker, amplifier or headphone
- Weighs only 12 pounds



6U — $69.95

America's lightest weight and lowest priced player for 16" transcriptions.

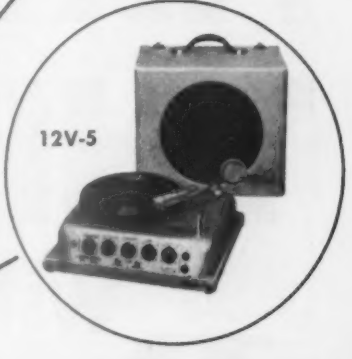
- 3-speed 9" turntable
- Wrist-action pickup with new ceramic cartridge
- 4 watt high gain amplifier
- Powerful 8" speaker
- Tone control adjusts both treble and bass



7V-5 — $87.95 Plus Excise Tax

The choice by comparison in classroom players, with Califone's exclusive Varipole variable speed.

- 4-speed 10" turntable
- Wide range tone control
- Plays 7"-12" records with lid closed
- 8" 3.2 oz. Alnico V speaker
- New ceramic cartridge
- Output jack for external speaker, amplifier or headphone
- Weighs only 12 pounds



12V-5 — $122.50
12VJ8-5 — $127.50

Recommended where one player must serve many requirements, this unit is our most popular model. Ideal for dancing, music, public speaking, typing classes and auditorium use for up to 1,000 persons.

- 4-speed Varipole 10" turntable
- 6 watts undistorted, 10 watts peak
- New ceramic cartridge
- Wrist-action pickup for 7"-16" recordings
- Mixer controls: mike & phonograph
- Separate treble and bass controls
- Library Model 12VJ8-5 offers provision for eight sets of headphones

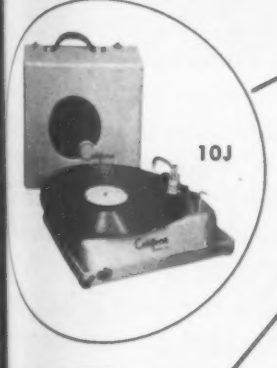
PHONOGRAPHS

TRANSCRIPTION PLAYERS

SOUND SYSTEMS

CALIFONES are recommended for Classrooms, Libraries, Auditoriums and Gymnasiums. There is a Califone model for every school requirement.

VARIPOLE is Califone's exclusive, patented variable speed control—an accurate means of slowing down or speeding up the tempo for the full and proper use of rhythm.



10J — $84.50

This new 16-pound transcription player brings true fidelity to the classroom at a low price never before possible.

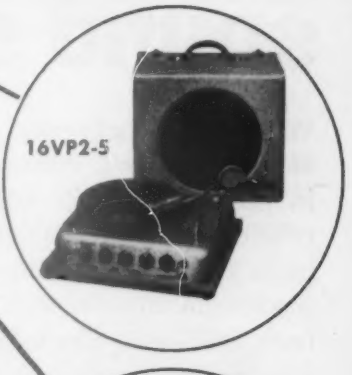
- 3-speed 9" turntable
- 8" extended range speaker
- 5 watts undistorted, 7 watts peak
- Wrist-action pickup for 7"-12" records, with new ceramic cartridge
- Mixer controls for mike and phonograph
- Separate treble and bass controls



10P2-5 — $99.50

This popular high fidelity model now offered with an extended range 12" speaker to get the most out of its G.E. variable reluctance cartridge.

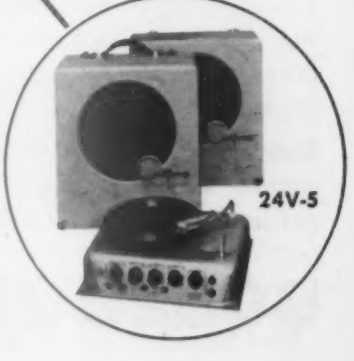
- 3-speed 9" turntable
- 12" custom concert speaker
- 5 watts undistorted, 7 watts peak
- G.E. variable reluctance cartridge and preamplifier
- Wrist-action pickup for 7"-16" records
- Mixer controls for mike and phonograph
- Separate treble and bass controls



16VP2-5 — $139.50
18VP2-5 — $159.50

A more powerful version of our popular Model 12V-5 transcription player with G.E. variable reluctance cartridge and built-in preamplifier for highest fidelity.

- 4-speed Varipole 10" turntable
- Maximum range straight AC amplifier
- 10 watts undistorted, 12 watts peak
- 25' speaker cable
- One 12" custom speaker on 16VP2-5
- Two 12" custom concert speakers on 18VP2-5



24V-5 — $169.50

Most powerful single unit sound system to cover 3500 persons. Extra bass emphasis for dance groups. Weighs only 31 pounds.

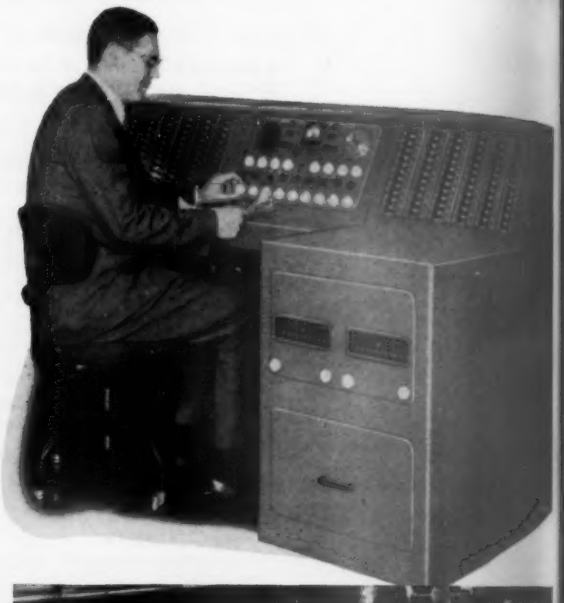
- 4-speed Varipole 10" turntable
- Wrist-action pickup for 7"-16" recordings with new ceramic cartridge
- 3-position mixer for 2 mikes and phonograph
- 16 watts undistorted, 24 watts peak
- 25' speaker cables
- Two 12" custom concert speakers

All prices quoted are School Net prices subject only to quantity discounts.

DAVID BOGEN COMPANY, INC.

29 Ninth Avenue, New York 14, N. Y.

YOU ARE THERE with a *Bogen* sound system





With a push of a button you achieve the goal of the modern educator: one-room schoolhouse intimacy in a building with hundreds of pupils, a personal relationship with youngsters you might otherwise never know. Use your Bogen sound system for 2-way intercommunication with any classroom, for distributing radio and recorded programs and activities or programs originating from any classroom, for making emergency announcements and for the many other applications that will occur to you in the course of the school day.

Bogen gives you this "one-room schoolhouse" intimacy for less than you think. Regardless of how much more you might spend, you cannot buy a more dependable or a more practical sound system. Bogen consoles give you all the functional features recommended by the U. S. Office of Education and make it possible for you to purchase only the equipment you actually need, thanks to modular design; each unit is complete in itself, but permits additions as your school grows. Some models also can bring about sizeable savings through eliminating the need for separate wiring and bells for the classroom change system.

Write for the complete catalog and name of your local Bogen sound specialist. He can show you how to save money in planning your sound systems.

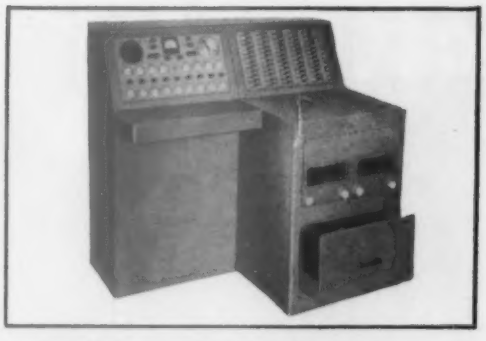
BOGEN IS THE COUNTRY'S LARGEST

DAVID BOGEN COMPANY, INC.

A BOGEN SYSTEM for every need

DUAL-CHANNEL CONSOLE MODEL "DU" SERIES

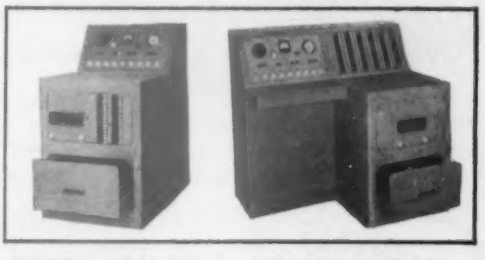
This series represents the fullest development of centralized sound system technique. The two-channel feature means that a radio program may be distributed to one class, a second radio or record program to another class — while at the same time intercommunication may be carried on with a third classroom. Features include: four microphone inputs, tape recorder input, two remote telephone line inputs, exclusive room pickup feature, high fidelity radio tuners (AM-FM or AM), phonograph, remote control of two inputs; classroom privacy feature and annunciator indication of room calling are optional.



BOGEN DU 72 WITH 2 TUNERS

SINGLE-CHANNEL CONSOLE MODEL "SCH" SERIES

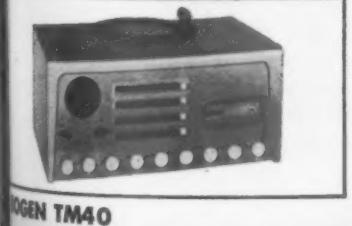
Similar to the Bogen "DU" series but designed for schools that require only a single channel for radio or record programs. Intercommunication can be carried on with any classroom simultaneously. Features include: three microphone inputs, tape recorder input, remote telephone line input, exclusive room pickup feature, high fidelity tuner (AM-FM or AM) and phonograph; classroom privacy feature and annunciator indication of room calling are optional.



BOGEN SCH 30 BOGEN SCH 90

TABLE MODEL "TM" SERIES

Single complete unit provides all essential central control school services at moderate cost. Single channel 30 watt amplifier provides for program distribution and intercommunication (not simultaneously). Two microphones can be mixed or faded with phonograph or radio. One or more rooms can be reached at one time. Sets permanently for privacy or non-privacy operation. AM radio tuner may be replaced with AM-FM at extra cost. Built-in 3-speed record player.



BOGEN TM40

ECONOMY "SA" SERIES

Ideal for small schools, small budgets. Built-in 10 watt amplifier provides for program distribution, intercommunication, emergency announcements, classroom initiation of calls. Built-in monitor speaker serves as microphone. Your own radio or phonograph may be hooked to unit. Teachers may originate calls to control unit by voice or by addition of inexpensive IA annunciator system. Sets for privacy or non-privacy operation.



BOGEN ECONOMY SA40

TRANSCRIPTION PLAYERS

The VP17 and VP17X portable transcription players are equipped with the new Bogen variable speed control which permits you to slow down or accelerate the three nominal speeds. This variable-speed feature makes the Bogen player ideally suited for a variety of school uses: in music, speech and language classes, during dancing periods and at gym sessions.



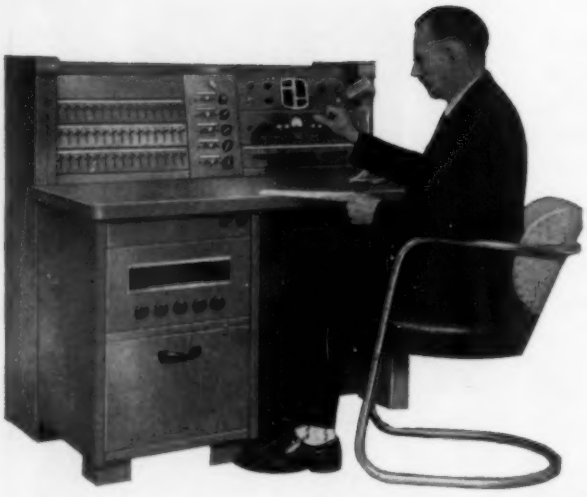
MODEL VP17

MANUFACTURER OF SOUND SYSTEMS

DUKANE CORPORATION

ESTABLISHED AS "OPERADIO" 1922

St. Charles, Illinois



DuKane

SCHOOL SOUND SYSTEMS—

Complete and functional systems . . . strikingly beautiful and engineered to meet every school need.

An efficient and flexible sound system is essential to the high operation standards demanded by today's modern teaching methods. ADMINISTRATION is made easier, EMERGENCY hazards minimized and EDUCATIONAL benefits greatly increased. Radio and phonograph programs or announcements can be distributed to any area . . . classrooms, auditorium, gym, cafeteria . . . the entire student body. Two-way conversation can be provided. Emergency switch turns on the entire system, at pre-set volume . . . no fumbling when seconds count.

Eight standard systems to choose from, in racks or consoles, or yours can be built to your own specifications. Single, dual, or three-channel systems, for schools with 10 rooms or 180.

INVESTIGATE! MAKE SURE YOUR SYSTEMS HAVE THESE FEATURES!

★ Modern ★ Compact ★ Economical
★ Flexible in construction ★ Pre-set emergency operation ★ Auxiliary channel intercom ★ "No Drift" radio tuner ★ Flexible program selection
★ Foldaway automatic record player
★ Underwriters' approved

★ *You owe it to your school to look into the many advantages a DuKane system offers.*

OTHER DUKANE PRODUCTS TO COMPLEMENT . . .

TALK INSTANTLY—SAVE TIME—SAVE STEPS

with FLEXIFONE *Intercom*



Ideal for increasing the administrative efficiency of the school! Flexifone models are available in any size—from 3 stations to 20 stations in the standard model. Adaptable to unlimited capacity by addition of extra switch banks. Streamlined modern cabinets compliment any desk! The DuKane "Hi-Power" Intercom, with unlimited station capacity is perfect for those noisy areas previously considered impractical to cover.

All models are designed and engineered for highest quality performance.

FOR FURTHER INFORMATION WRITE

DUKANE CORPORATION

ESTABLISHED AS "OPERADIO" 1922

St. Charles, Illinois

DuKane

"Tru-Fidelity"

TAPE RECORDER



. . . offers you Magnificent Fidelity Professional Quality Tape Recording at Low Cost!

The New DuKane Tape Recorder is the most amazing achievement in the low-price field . . . the only recorder to offer you "Tru-Fidelity." Simple to operate—one control for "Fast Forward, Forward, Stop, Rewind," and one each for tone and volume. Piano-action keys are provided for "Microphone, Auxiliary, Play, Record."

The newly engineered mechanism features a minimum of moving parts and rigid, heavy-duty construction, offering you the utmost in durability and lifelong service and satisfaction.

The high fidelity amplifier is designed for superb sound. A specially built DuKane speaker and matching baffle gives faithful reproduction.

Frequency response characteristics meet standards set by National Association of Radio and Television Broadcasters for radio broadcast and portable and studio equipment.

This recorder was designed and built for you—and—built to last!

Check *These Features:* Two Speeds: 7½ and 3¾ • Dual Track • Fast Forward • Fast Rewind • Single Tape Motion Control • Keyboard Facility Selector • Positive Safety Erase • Magic Eye Level Indicator • Rugged Tape Mechanism • Tape Copying Facility • Separate Inputs for Microphone, Radio, and Phonograph • Rack or Custom Mounting • Public Address System • 7½ Watt Amplifier • Easy Tape Loading • Headphone Monitoring • 6" x 9" Dynamic Power Speaker • Tape Counter • Storage for 8 Reels • Easy Servicing

. . . MODERN TEACHING METHODS—*TRAIN WITH DUKANE!*

A New Teaching Method . . . and a New Teaching Tool . . .

The DuKane "Recordmaster" 3-speed phonograph and transcription player gives the teacher complete control of classroom recording and sound filmstrips by use of the exclusive "discussional control."

Ask about the ninety new Student Participation Films by DuKane for use with the "Recordmaster".



DUKANE CORPORATION DEPT. SU6, St. Charles, Ill.

PRESTO RECORDING CORPORATION

Paramus, New Jersey

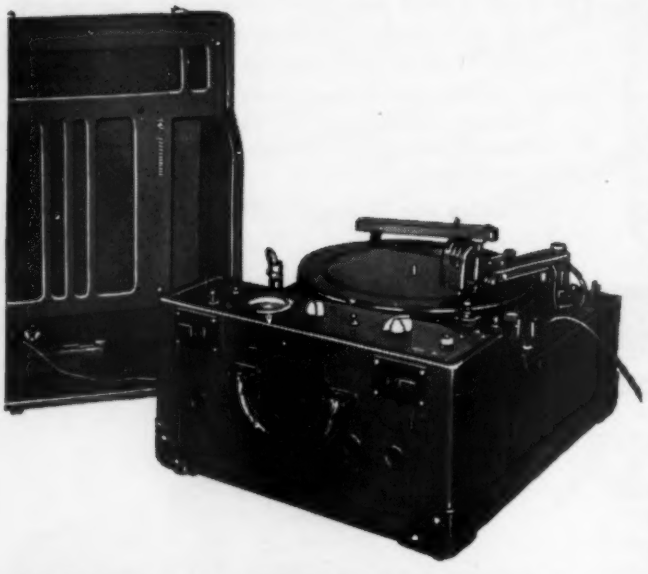
EXPORT DIVISION: 25 WARREN STREET, NEW YORK 7, N. Y.
CANADIAN DIVISION: WALTER P. DOWNS, LTD., DOMINION SQUARE BLDG., MONTREAL

Have you rediscovered the ADVANTAGES of DISC Recording?

- **ready reference—*saves time!***
- **playback on any phonograph—no special tape equipment!**
- **easy filing—*saves work!***
- **no danger of magnetic erasures—*insures permanence!***

Remember, only disc recording enables you to record visually and label your records so that any portion may be located without the delay of playing back the entire recording. —and in disc recording, as in all recording...

PRESTO MAKES THE BEST!



PRESTO K-10 DISC RECORDER

- **cuts discs up to 13½" in diameter**
- **operates at 33⅓, 45 and 78 rpm speeds**
- **standard feed pitches of 112 and 224 lpi**
- **compact, lightweight, portable!**



PRESTO ORANGE LABEL RECORDING DISCS

high quality—low cost—fitting companion to the K-10 Recorder

You know the flawless recording surface of PRESTO discs...the finest in the world! Here is the superb quality lacquer coating of the most expensive PRESTO discs...on a lighter weight aluminum base ...at less than 60% the cost!

EVERETT PIANO COMPANY

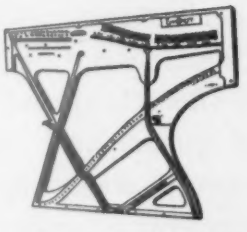
Division of Meridan Corp.

South Haven 10, Michigan

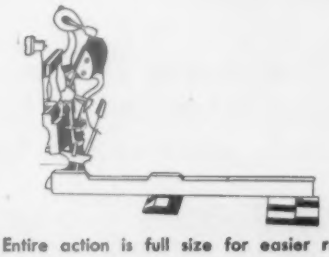
EVERETT STANDARD OF COMPARISON AMONG SCHOOL PIANOS



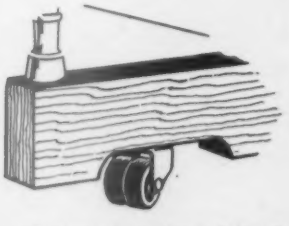
There are several reasons why the Everett *Style 10* is considered the standard of comparison among school pianos. First of all, the *Style 10* is sturdily built. From its "full cast" plate and hard maple pin plank to its double veneered case, every detail is engineered for long, hard service. Too, the Everett is a style leader with its graceful lines which enhance any setting. More important, the beautiful tone of an Everett is praised by music educators everywhere. Extra string length needed for full, resonant tone is provided by the 44-inch height. Full-size action permits unexcelled playing ease. Before you choose any school piano, investigate the Everett *Style 10*, America's most popular school piano. AND . . . one of the lowest-priced.



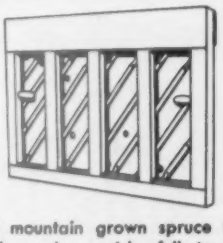
"Full cast" gray iron plate for extra rigidity, keeps piano in tune longer.



Entire action is full size for easier response, greater power.



Either 2" school-type casters (above) or standard 1" casters may be used without changing height of pedals or keyboard from floor.



Finest mountain grown spruce sounding board produces rich, full tone in all registers.

GET THE FACTS! *Write for your free copy of "Report 10," a factual rundown on school piano specifications. Everett Piano Company, Division of Meridan Corp., South Haven 10, Michigan.*

THE BALDWIN PIANO COMPANY

Home Office and Factory—Dept. ASU-55, 1801 Gilbert Avenue, Cincinnati 2, Ohio

Builders of: Baldwin Grand Pianos • Acrosonic Spinet Pianos • Hamilton Vertical Pianos • Baldwin and Orga-sonic Electronic Organs

---

Recognizing today's highly exacting needs and demands in the field of education, the Baldwin Piano Company, builders of the world's finest keyboard instruments, has established quality and durability as the true measure of piano and organ value. These requirements must be fully met if educators are in turn to meet their responsibilities to today's youth.

That is why Baldwin and Baldwin-built pianos and organs are the choice of leading schools, conservatories, and colleges.

In appraising your piano and organ requirements call on your Baldwin dealer for assistance. You will find him willing and able to assist you in determining the proper style, size and type of Baldwin-built instrument to meet your needs today and in the years ahead.

Only Baldwin offers a complete selection of instruments built to uncompromising quality standards ranging from the 9′ Baldwin Concert Grand to the 36″ Acrosonic Spinet.

Baldwin



The Baldwin Style "F" Grand

The Style "D" Baldwin Concert Grand (length 9′) and Style "F" Grand (length 7′) are available in ebonized finish, the Style "L" Grand (length 6′, 3″) and Style "R" Grand (length 5′, 8″) are available in mahogany and ebonized finish and the Style "M" Grand (length 5′, 2″) is available in mahogany, walnut and ebonized finish.

The Baldwin Grand is the instrument chosen by today's outstanding concert artists who know and insist on the finest. Those charged with the responsibility of purchasing pianos for school use will do well to be guided by the considered opinion of these experts, for, truly, the Baldwin Grand is the piano by which all are judged.



The Hamilton Vertical Piano

The Hamilton Vertical, built by Baldwin, has won its place as a leading piano for school and studio use by meeting the need for a compact piano with full resonant tone and exceptional response. Equipped with special school casters to facilitate moving, the Style 242 Hamilton is available in dark oak, light oak, or mahogany finish. Height 45″, Width 56″, Depth 25″.



The Acrosonic Spinet Piano

Available in eight distinctive and beautifully styled models, the Acrosonic by Baldwin features the famous "Full-Blow" action in addition to the many other outstanding and exclusive construction features that have made the Acrosonic "today's finest small piano." The Acrosonic Spinet is built in both the 36″ and 40″ heights and offers a selection of beautiful and durable hand-rubbed finishes. Model 979, illustrated.



The Orga-sonic Spinet Organ

The Orga-sonic Spinet Organ by Baldwin is ideally suited to school budgets and requirements. Tone color range is broad and comprehensive. All four basic families of organ tone are adequately represented. 19 independent stops and one coupler give utmost flexibility. Model 40, illustrated, requires less space than a spinet piano. Height 37¼″, Width 46″, Depth 26″.



The Baldwin Electronic Organ

The Baldwin Electronic Organ, Model 10, is a complete and comprehensive organ. Adhering to standards established by the American Guild of Organists, specifications include thirty-one independent stops, ten couplers, double expression, register crescendo pedal and ten completely adjustable combination pistons. With these special features, the musical variety and tonal responsiveness of the Model 10 are virtually unlimited.

See Your Dealer or Write Direct Today!

FRANK ADAM ELECTRIC CO.

Makers of: BUSDUCT • PANELBOARDS • SWITCHBOARDS • SERVICE EQUIPMENT • SAFETY SWITCHES • LOAD CENTERS • QUIKHETER

Box 357, Main P.O. • Phone JEfferson 3-6550 • St. Louis, Missouri

FA **BULLETINS**

SIMPLIFY YOUR JOB

OF SPECIFYING POWER AND LIGHT CONTROL AND DISTRIBUTION EQUIPMENT





Send for copies today: You will find these bulletins most helpful in planning and specifying power and light control and distribution for all types of buildings.

FA **Bulletins** have been designed specifically for architects, engineers, contractors and others — to assist them in the highly technical job of planning and specifying the right equipment for each job — equipment that is safe, dependable, long-lasting and will provide trouble-free service.

FA **Bulletins** available for immediate delivery include those dealing with Stage Lighting Controls, Load Centers and Service Equipment, Lighting Panelboards, Feeder Distribution Panelboards, Enclosed Safety Switches, Quikheters, Floor Boxes and Hanger Outlets. Other bulletins now in the course of preparation include Busduct, Wireduct, etc.

Copies of these bulletins are yours for the asking. A letter or post-card will bring them to you promptly.

FRANK ADAM ELECTRIC CO.

REPRESENTATIVES

ATLANTA 2, GA. ..... **Herman Junghans**
(P. O. Box 111) 37 Wilshire Drive 1,
Avondale Estates, Ga. ..... DEarborn 1315
BALTIMORE 2, MD. ..... **E. A. Gerstenberg**
1540 Barclay St. ..... Vernon 7-1100
BIRMINGHAM, ALA. ..... **J. L. Howarth Co., Inc.**
3021 Seventh Ave., South ..... Phone 53-1171
BOSTON 29, MASS. ..... **Herbert Madden Co., Inc.**
17-23 Phipps St. ..... Charleston 2-3630
BUFFALO 2, N. Y. ..... **Hunter & Bell Co.**
858 Main St. ..... Elmwood 2210
CHICAGO 7, ILL. ..... **Triangle Equip. Co., Inc.**
610 W. Van Buren St. ..... FRanklin 2-3630
CINCINNATI 6, OHIO ..... **Miller Kleine**
2906 Woodburn Ave., Office No. 11 ..... University 4878
CLEARWATER, FLA. ..... **Elmer Rasmussen**
205 Court Square Bldg. (P. O. Box 264) 3-2542
FT. LAUDERDALE, FLA. ..... **P. J. Webb**
416 S. E. 11th Court (P. O. Box 1516) 2-2684
MIAMI 47, FLA ..... **Bryan P. Fisher**
P. O. Box 365, N. W. Station 78-9816
CLEVELAND 14, OHIO ..... **Gordon F. Stofer & Bro.**
707 E. St. Clair Ave. ..... Superior 1-3535
COLUMBUS 4, OHIO ..... **Gordon F. Stofer & Bros.**
101 North High St. ..... CApital 1-4403
DALLAS 1, TEX. ..... **P. A. Michler**
2807 Allen St. ..... Prospect 0108
DENVER 2, COLO. ..... **F. E. Staible & Sons**
2046 Arapahoe St. ..... TAbor 5-3991
DES MOINES 14, IA. ..... **Midwest Equipment Co.**
842 Fifth Ave. 3-1203
DAVENPORT, IA. ..... **Midwest Equipment Co.**
736 Federal St. 7-4074
DETROIT 27, MICH. ..... **J. P. Laughlin**
10330 Puritan Ave. ..... UNiversity 4-6425
HOUSTON 2, TEX. ..... **B. L. Winkler**
776a M. & M. Bldg. ..... Fairfax 6225
INDIANAPOLIS 4, IND. ..... **Harry L. Dickinson**
404 Merchants Bank Bldg. ..... FRanklin 3688
KANSAS CITY 8, MO. ..... **B. L. McCreary & Son**
1819 Central St. ..... Harrison 1668
LITTLE ROCK, ARK. ..... **N. B. Nichols**
2509 Bishop St. ..... Franklin 4-6797
MINNEAPOLIS 2, MINN. ..... **Cooper, Page Co.**
617 National Bldg. ..... GEneva 2121
NEW ORLEANS 12, LA. ..... **W. J. Keller**
415 Natchez St. ..... MAgnolia 3603
NEW YORK 19, N. Y. ..... **Fred G. Kraut & Son**
419 W. 54th St. ..... Columbus 5-6861
OKLAHOMA CITY 6, OKLA. ..... **Ray Sullens**
1941 N. W. 17th St. ..... JAckson 8-2979
OMAHA 2, NEB. ..... **Midwest Equipment Co.**
1614 Izard St. ..... ATlantic 7600
PHILADELPHIA 3, PA. ..... **Paul F. Kyack**
10 S. 18th St. ..... RIttenhouse { 6-9024 / 6-8328
PITTSBURGH 22, PA. ..... **J. R. Schmidt**
200 Magee Bldg. ..... ATlantic 1-5402
RICHMOND 26, VA. ..... **W. E. Sullivan, Jr.**
6211a West Broad Str. Road 88-6200
ST. LOUIS 6, MO. ..... **O. H. Rottmann**
1023 N. Grand Blvd. ..... JEfferson 3-7100
SAN FRANCISCO 5, CAL. ..... **Columbia Electric Mfg. Co.**
275 Steuart St. ..... GArfield 1-6101
SEATTLE 9, WASH. ..... **Standard Electric Sales**
550 Mercer St., Suite 101 ..... Alder 5999
SPOKANE 22, WASH. ..... **W. A. Crowder**
1011 East Empire Ave. ..... MAdison 2244
SYRACUSE 10, N. Y. ..... **F. L. Grant**
625 Cumberland Ave. 72-1831
TULSA 5, OKLA. ..... **Elmer W. Luebbert**
1203 E. 31st St. 72-8684

EXPORT REPRESENTATIVE

ST. LOUIS 7, MO. ..... **T. G. Rogers**
5411 Bulwer Ave.
(P. O. Box 59, Baden Station) ..... EVergreen 1-3700

Typical (FA) Quality Products

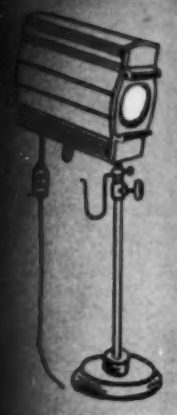


ART CRAFT THEATRE EQUIPMENT CO.

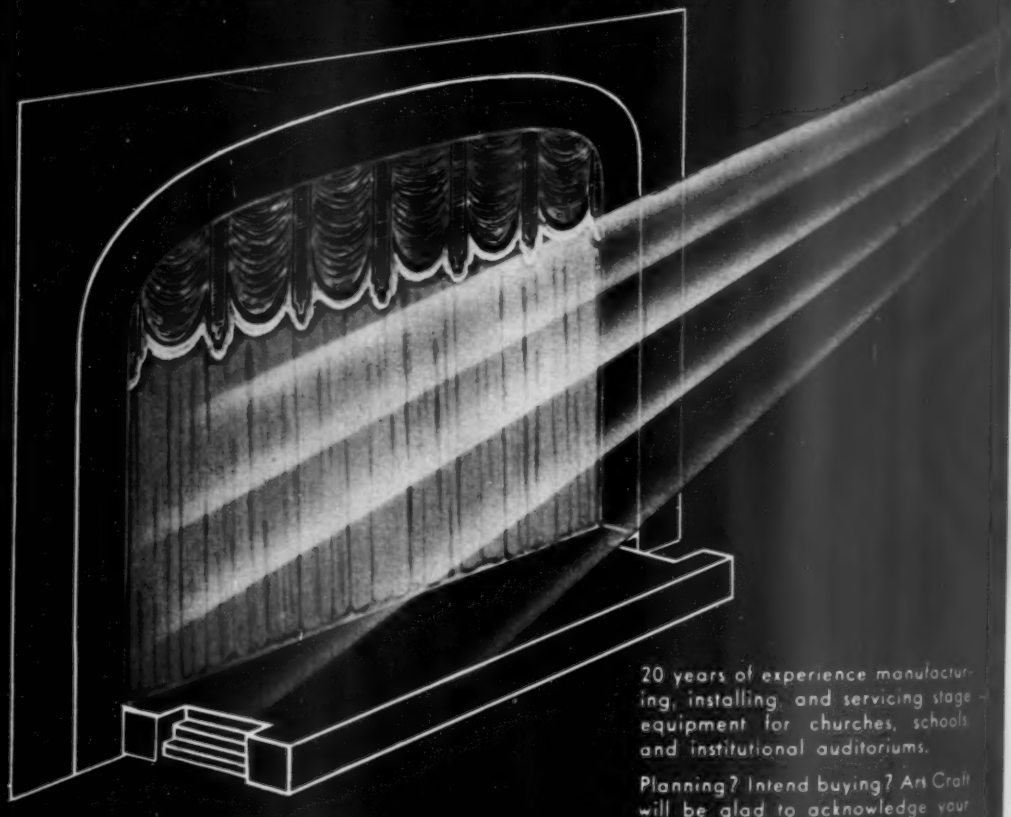
108 West 46th Street • New York 19, N. Y.

Complete STAGE EQUIPMENT

- cycloramas
- window draperies
- stage curtains
- lighting equipment
- dimmers
- steel tracks
- stage hardware
- asbestos curtains
- motor controls
- scenery
- stage rigging
- velour rope railing







20 years of experience manufacturing, installing and servicing stage equipment for churches, schools and institutional auditoriums.

Planning? Intend buying? Art Craft will be glad to acknowledge your inquiries promptly.

REQUIREMENTS FOR QUOTATIONS

1. Width and height of proscenium
2. Height from stage floor to ceiling.
3. Depth of stage.
4. Width on stage.

Upon receipt of measurements, samples and price will be mailed upon request. For descriptive literature, specify circular No. 303

ARTCRAFT

The House
THAT CONFIDENCE BUILT



Century Lighting, Inc. 521 West 43rd Street, New York 36 | Chickering 4-7050

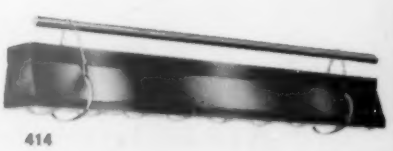
stage architectural television studio lighting | light control equipment

More than 25 years in the highly specialized field of auditorium and stage lighting, provides Century's engineers with the know-how that creates modern and efficient low cost instruments. As part of the Century service, an Aid Department is maintained to afford necessary help to solve problems. Complete fact sheets on architectural and stage lighting equipment are also available, without charge, upon written request.

Stage lighting

Century has developed a complete line of lighting equipment and accessories. Many of the instruments introduced originally by Century are practitioners' standard tools.

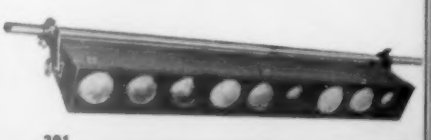
	cat. no.	function	length	wattage	outlets	price
Borderlights *Alzak reflectors* *heat resisting colored glass roundels* *chain hangers* *scenery guards* *splice box*	411 413 414	blending and toning the acting areas with a variety of color	To order	100 200-300 300-500	6" O.C. 8" O.C. 12" O.C.	On application
Footlights *Alzak reflectors* *heat resisting colored glass roundels* *kiln-dry maple trim* *automatic mercury cut-off switches*	816 817	toning of set and illuminating shadows on faces	5'2" 5'2"	100 100	12 9	$116.00 $123.50
"Paint with Light" Strip *Combination holders with 55° spread* *heat resisting colored glass roundels* *individual compartments* *wired for PAR 38 or R-40 lamps*	394 391 397	blending of acting areas and toning set with 3 color system	4'6" 6' 7½"	150-300 150-300 150-300	9 12 15	71.50 95.70 119.63



414



817



391

Stage lighting *continued*

	cat. no.	function	lens diam.	wattage	beam spread	price
3000 Watt Follow Spot *Alzak ellipsoidal reflector* *heat resisting Fresnelens* *interior parallel, horizontal shutters and iris* *spread roundel for wide beam* *spring-balanced stand* *switch and cable* *focusing handle and lock*	1541	incandescent follow spot rear of house up to 100′	12″	3000	12° max.	$467.50
Lekolites *Alzak ellipsoidal reflector* *heat resisting lenses* *interior 4-way shutters* *yoke and C clamp*	1568	lighting front acting areas for framing beam to an area	8″	1000-2000	20° max.	$121.00
	1575		8″	250-750	16° max.	82.50
	1591		6″	250-750	27° max.	60.50
	1581		4½″	250-750	45° max.	55.00
	91597		6″	750	23° max.	45.00
Fresnelites *Alzak reflector* *heat resisting Fresnelens* *yoke and C clamp*	500	lighting rear acting areas with soft edge beam, and for giving high powered accents	6″	250-750	15°-60°	$22.00
	526		8″	1000-1500	15°-45°	56.00
	530		10″	2000		82.50
Fresnelite Jr. *Alzak reflector* *heat resisting Fresnelens* *yoke and base*	1211	compact accent light for close quarters	3″	75-150	16°-40°	$18.00
Beamlight Projectors *Alzak parabolic reflector* *built in baffle* *yoke and C clamp* *focusing adjustment*	1502	intense narrow beam used for sunlight and moonlight	16″	1000-2000	12°-18°	$60.50
	1515		10″	250-750	8°-14°	52.80
Floodlights *Alzak Reflector* *No. 1305 has yoke and C clamp* *No. 2927 has universal mounting bracket*	1305	wide angle flood lights lighting large areas at close range	16″	750-2000	50 ft. wide	$38.00
	2927		10″	250-400	40 ft. wide	14.50


1541


1568


500


1211

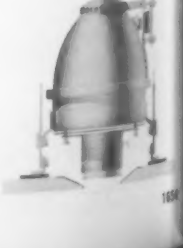

1502


1305

Architectural lighting

	cat. no.	wattage	aperture or lens size	height & access	ceiling opening	beam spread	price
Project-O-Lites *Alzak reflector* *heat resisting lens* *interior 4-way shutters* *plaster rings or cones* *4′ of Greenfield, 5′ of A.F. wire*	1647	1000-2000	8″	35″ T	7½″	20 max. hard	$106.70
	1646	250-750	6″	23½″ T		27 max. hard	58.30
	1645	250-750	4½″	22½″ T		45 max. hard	53.90
	1654	250-400	3½″	17⅜″ T		70 max. hard	66.55
	1653	250-400	3½″	16½″ B	14⅜″	70 max. hard	72.60
	1651	100	1″	11″ B	7⅞″	90 max. hard	44.00
	1622	100	1½″	9½″ T		90 max. hard	44.00
	1623	100	1½″	9½″ B	7⅞″	90 max. hard	50.60

T = Top B = Bottom



Architectural lighting *continued*

Downlights

Open Reflector Type

Alzak reflector
plaster rings or cones
wide spread soft edge
distribution of light
complete cut-off beyond 45°
from vertical
4' of Greenfield, 5' of A.F. wire

cat. no.	wattage	aperture	height & access	ceiling opening	beam spread	price
935	750-1000	8"	27½"T		90° Soft	$77.00
939	750	8"	27½"B	16¾"	90° Soft	75.00
960	500	7"	22"T		90° Soft	60.50
963	500	7"	21"B	14⅛"	90° Soft	63.80
933	200-300	6"	13"T	12⅛"	90° Soft	33.30
930	200-300	6"	13"B	12⅛"	90° Soft	30.00
932	100	5¼"	9¾"B	8½"	90° Soft	19.00

T = Top B = Bottom



Flush Fresnelens type

etched aluminum reflector
heat resisting Fresnelens
wide spread low brightness,
even distribution of light
plaster rings
4' of Greenfield, 5' of A.F. wire
trim can be colored (extra cost)

	cat. no.	wattage	lens size	height & access	ceiling opening	beam spread	price
circular lens	2214	200-300	14" dia.	10¼"B	15¼"	100° Soft	35.00
	2212	200-300	12" dia.	10¼"B	13⅜"	100° Soft	28.25
	2210	150	10" dia.	9"B	11⅜"	100° Soft	21.00
	2202	100	8" dia.	7½"B	9½"	100° Soft	17.25
	2201	40-75	6" dia.	7"B	7"	100° Soft	13.50
	2203	40-75	3" dia.	6½"B	5"	50° Soft	12.50
square lens	2220	200-300	12"	10¼"B	14⅜"	100° Soft	26.00
	2221	150	8½"	9"B	10⅞"	100° Soft	20.00
	2222	40-100	6½"	7½"B	8⅜"	100° Soft	18.00
pan recess lens	2244	200-300	14" dia.	10¼"B	5"	100° Soft	33.88
	2242	200-300	12" dia.	10¼"B	7"	100° Soft	29.15
	2240	150	10" dia.	9"B	9½"	100° Soft	24.20
	2238	100	8" dia.	7½"B	11⅜"	100° Soft	20.00
	2236	40-100	6" dia.	6½"B	13⅜"	100° Soft	17.00
	2233	40-100	3" dia.	6½"B	15¼"	100° Soft	12.65



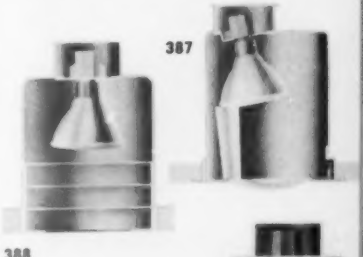
Internal Reflector Lamp type

No. 1664 has plaster cone
all other units have plaster rings
and ceiling plates
4' of Greenfield, 5' of A.F. wire

*The 1664 and 1665 units are 35 watt "Pinhole" downlights with built-in transformers. All lamp brightness cut off softly at 45°.

cat. no.	wattage	aperture	height & access	ceiling opening	beam spread	price
388	150	5¼"	11¼"B,T	8½"	Soft	16.00
338	150	6"	9½"B	7¼"	Soft	11.50
*1664	20	1½"	9½"T		Soft	26.40
*1665	20	1½"	9½"B	5⅞"	Soft	30.80
396	150	5¼"	12½"B,T	8"	Soft	36.30
337	150	8¾"	11¾"B	10⅜"	Soft	18.75
352	150	5¼"	10⅛"B	10⅜"	Soft	18.25
387	150	5¼"	11¼"B	8½"	Soft	29.15

T = Top B = Bottom



396 45° tilt, concentric ring louvers
337 34° tilt, parallel louvers
352 34° tilt, without louvers
387 55° spread lens counterlight

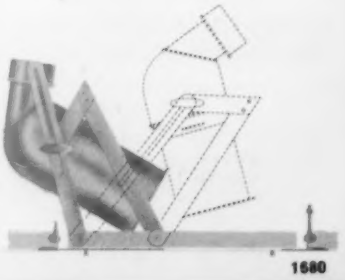


Recessed Lokolites

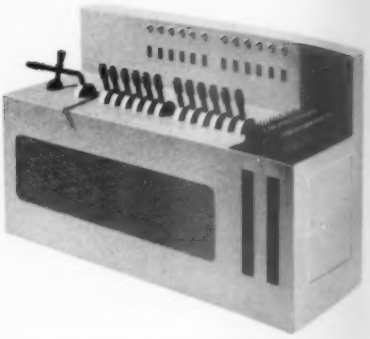
Alzak ellipsoidal reflectors
heat resisting lenses
interior 4-way shutters
2, 3 or 4 gang plaster frames
each unit individually adjustable
on Uni-strut framework
individual rotary carriages
for 1690 series
4' of Greenfield, 5' of A.F. wire

	*cat. no.	wattage	lens diam.	height & access	ceiling opening	beam spread	price
multigang	1840	250-750	4½"	21½"	26½" x 24"	45° max.	166.00
	1846	250-750	6"	21½"	26½" x 24"	23° max.	177.00
	1841	250-750	4½"	21½"	26½" x 36"	45° max.	235.00
	1847	250-750	6"	21½"	26½" x 36"	23° max.	251.00
	1842	250-750	4½"	21½"	26½" x 48"	45° max.	300.00
	1848	250-750	6"	21½"	26½" x 48"	23° max.	322.00
universally adjustable	1680	250-750	4½"	16⅞"	1680	45° max.	100.00
	1681	250-750	6"	23"	1681	23° max.	106.50

*Stepped lens series available at reduced cost



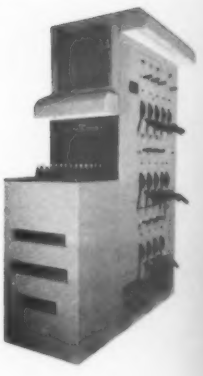
Control equipment



Auto Transformer Board—Console type

This basic system will satisfy many school and community theatre needs. Light sources, circuits and dimmers are numerous enough to permit a high degree of flexibility.

Cat. No. 2822 specifications include:
12 6000 Watt Rotostat dimmers
1 Master interlocking handle, 1 Transfer switch
54 Flexible load cords, 56 50 Amp. Saf-T-Jacks



Patch Panel and Free Standing Control Board

This board was designed to fit into a small area. Compact and highly efficient, it is 82" high, 22" deep and 60" wide. Worklite access top (fluorescent also over patch panel)

Specifications included:
9 2000 Watt Rotostats for flexible control
1 6000 Watt Rotostat for house light control
4 Saf-T-Jacks per flexible dimmer (total of 36) 50 Amps.
31 Cord sets and Saf-T plugs



Package Auto Transformer Board

Either portable or permanently installed, this type unit may be used in schools, churches, community theatres, clubs and restaurants.

It uses variable capacity auto-transformer type dimmers. Load connectors may be either permanent or portable.

No. 2861 has 6 1000 Watt auto transformers $425.00
No. 2864 has 4 2000 Watt auto transformers $740.00
No. 2866 has 6 2000 Watt auto transformers $1020.00



Patch Panel

Simple as a telephone switchboard to operate, the Patch Panel is the least expensive way of cross connecting circuits. This board permits a smaller number of dimmers than permanently connected loads. Any loads may be connected to any dimmer within capacity of dimmers, thus complete flexibility.

Numbered plugs indicate load circuits whether connected or in a retracted position. All circuits are protected and controllable by individual circuit breakers.

The Multiscene Preset C-I Board

The Preset C-I Board offers a number of advantages over all other types of controls.

Extremely flexible, provisions can be made to add additional circuits later.

The loading ratio is wide; controls are closely grouped and simple to operate. Fading and dimming can be either manually or electronically controlled. A console may be ordered with a few control units and additional controls can be added later. The picture to the right shows a 5 scene Preset C-I Board operated by students at The University of Nebraska.



Century lighting equipment is Engineered lighting equipment

Send for Catalog No. 1 Theatrical Lighting | No. 2 Architectural Lighting | No. 4 Television Lighting

Century Lighting, Inc.

521 West 43rd Street • New York 36, N.Y. *1820-40 Berkeley Street • Santa Monica, Calif.*

STAGE EQUIPMENT

Novelty



Corona Avenue School,
Valley Stream, N. Y.

Frederick Weidersum
Architect

SPECIALISTS
in the DESIGN
and
MANUFACTURE of:

STAGE CURTAINS • SCENERY
CURTAIN TRACKS • STAGE RIGGING
• DRAPERIES

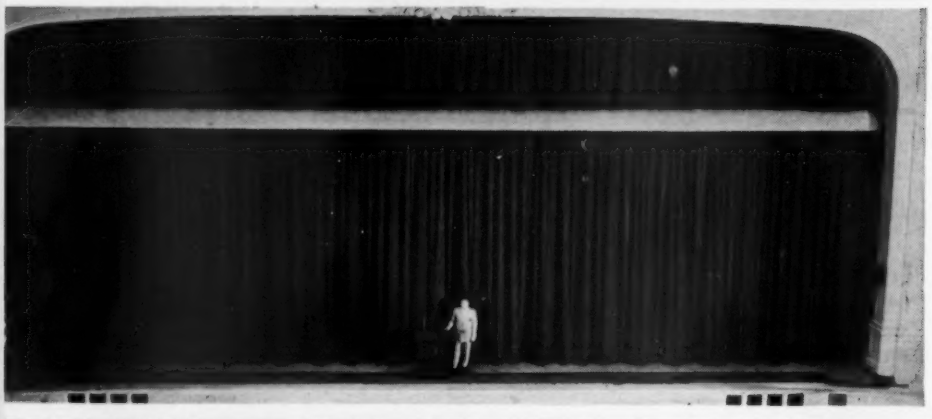
NOVELTY SCENIC STUDIOS, INC.

430 East 91 Street, New York 28, N. Y. • Tel. TRafalgar 6-0800

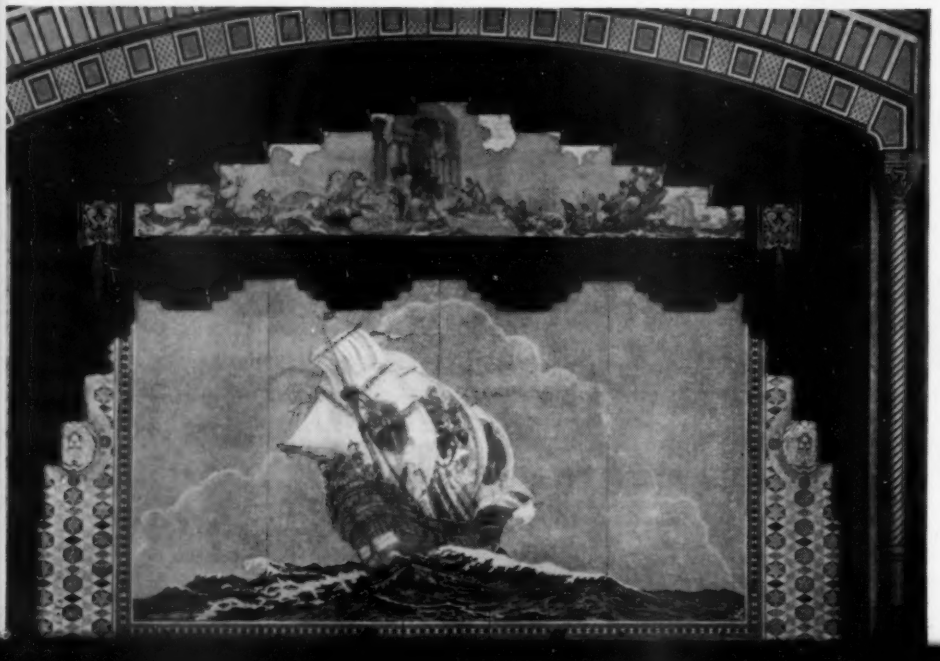
STAGE CURTAINS by Novelty



Brooklyn Academy of Music, Brooklyn, N. Y.
New stage curtains of boucle. Color combination is pale gold and dark grey.
Brown, Lawford & Forbes, Architects.
New York City.

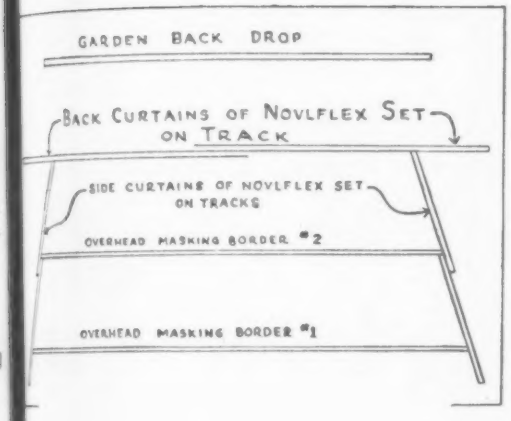


Thomas Jefferson High School, Brooklyn, N. Y. City of New York Board of Education.
Maroon Vinyl-coated front curtain and valance, also showing asbestos curtain slightly lowered — one of the largest "trip" type asbestos curtains ever installed. Size 75 ft. wide x 30 ft. high.



Convention Hall, Atlantic City, N. J.
The largest asbestos curtain in the world — 107 feet wide by 50 feet high.
Above asbestos curtain in lunette is mythological mural painted in oils on canvas and outlined in 23 karat gold.

THE *Novlflex* STAGE SETTING

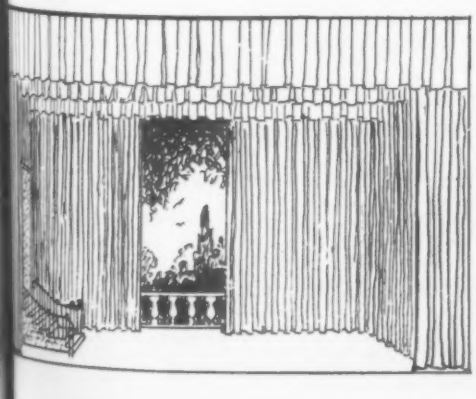


Floor plan of full stage setting, showing side curtains and rear curtains on track with garden back drop behind rear curtains.

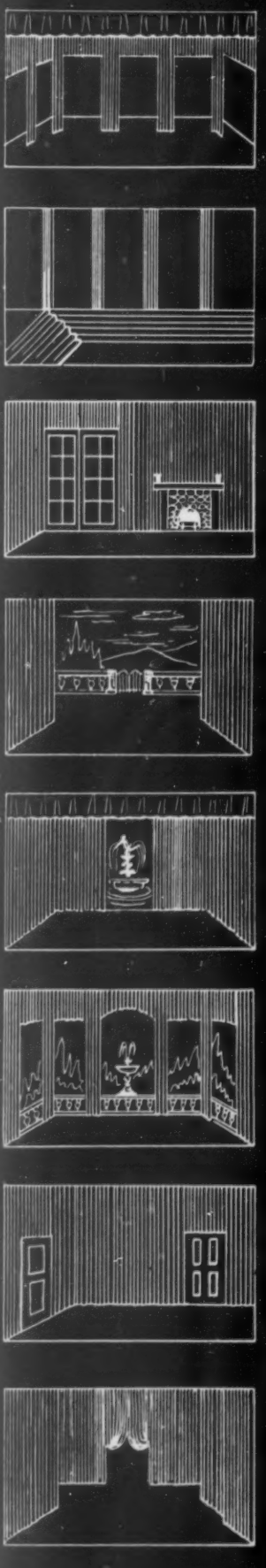
almost flexibility with minimum cost, the NOVLFLEX setting is almost indispensable. shown on this page, this setting lends itself conveniently to changes and can be embled in a multitude of forms.

fabric portion of the setting forming the "walls" hangs from one hinged cyclorama ten (aligned like three consecutive sides of a rectangle); or hangs on tracks arranged ss the back and sides so that the curtains may be drawn apart to leave openings, may be required, at any location in the setting. The material used in this setting be velour, rep or other appropriate fabrics in neutral shades of tan, taupe or grey.

NOVLFLEX setting can be applied effectively to any type of performance, from ndem scene to a fantastic costume play. Used together with a few specially built es to convey the proper atmosphere, a score or more variations in form and earance can be produced. The sketches to the right graphically portray a few of oses to which the NOVLFLEX setting may be put. Many other original effects are ible with this equipment.



Novlflex setting showing rear curtains partly open with balustrade and exterior back drop. Stage right with practical door, steps and hand rail.



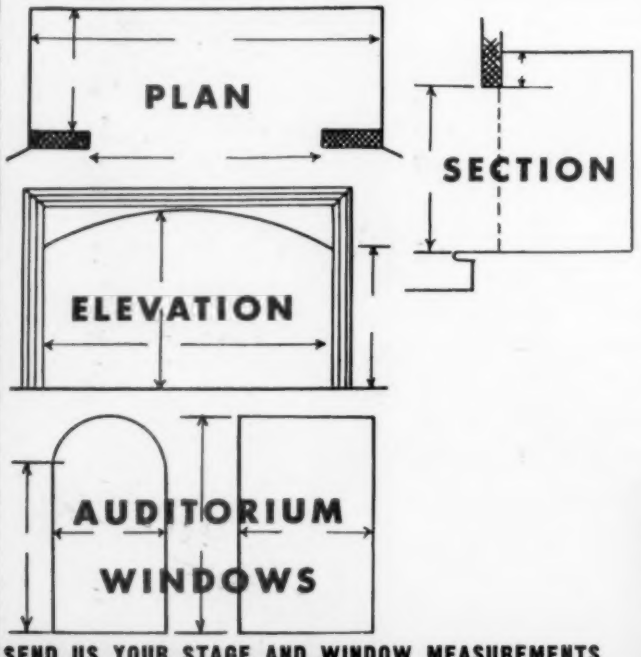
DRAPERIES by Novelty



Above: Drapery treatment for lounge.
DRAW DRAPES — Beige boucle casement • OVER DRAPES — Gold background with green and chocolate horizontal stripes, oatmeal and pale green vertical stripes • TURQUOISE CARPET • SOFA — Green with gold metallic stripes • CLUB CHAIR — Gold • ARM CHAIRS — Persimmon



Right: Board Room, Corona Avenue School, Valley Stream, N. Y.
DRAPES — Brown background with green, red and white print • MAHOGANY WALL PANELLING • GREEN LEATHER UPHOLSTERY
Frederick Weidersum, Architect



SEND US YOUR STAGE AND WINDOW MEASUREMENTS

PARTIAL LIST OF INSTALLATIONS

Oceanside High School, Oceanside, N. Y.
Village Green School, Huntington, N. Y.
Brooklyn College, Brooklyn, N. Y.
Bullard Haven School, West Haven, Conn.
New York City Public Schools
Board of Public Education, Philadelphia, Pa.
University of Wisconsin, Madison, Wis.
and hundreds of others.

NOVELTY

SCENIC STUDIO
430 EAST 61 STREET NEW YORK
TEmple 8-5641

AUTOMATIC DEVICES COMPANY

2121 S. 12th Street, Allentown, Pennsylvania



What Goes On...

BEHIND THE SCENES?

ADC Curtain Track Equipment

For auditorium stages, classroom partitioning and audio-visual blackout window draperies, look to America's greatest name in curtain tracks and controls.

STAGE CURTAIN TRACK

SILENT STEEL: For lengths over 36′ here is the most highly developed stage curtain track on the market. Track shape size is approximately 3″ x 3″. Each carrier is of ball-bearing construction, assuring absolutely noiseless operation. Carriers supplied every 12″. All pulleys, steel or fibre, are ball-bearing. Unlimited overlap. ADC balanced carrier principle: two rubber wheels rolling on two parallel track treads.

BESTEEL: For lengths up to 36′. This is a smaller edition of Silent Steel. Track shape size is approximately 2″ x 2″. Recommended for use with medium-weight curtains. Carriers supplied every 12″. All pulleys, steel or fibre, are ball-bearing. Unlimited overlap. ADC balanced carrier principle. Also available with nylon tire or neoprene tire ball-bearing carriers.

DRAPERY TRACK

SPANOTRAC: The new aluminum light-to-medium duty drapery track, specifically designed for darkening draperies in audio-visual classrooms and for partitioned classrooms. Track shape size is approximately 1″ x 1″. Installed single in one section with overlap accomplished by master carriers with extension arms by-passing each other. Maximum overlap of master carriers is 8″. Carriers supplied every 6″ along track and include the ADC balanced carrier principle. Nylon end pulleys help maintain quiet operation. If more overlap is required, Spanotrac is available as a two-section track assembly.

WINDOW CURTAIN TRACK

For long windows, we recommend FENESTEEL track for lengths up to 36′. This track shape size is approximately 2″ x 2″ and is recommended for use with medium-weight curtains on long window spans and small stages. Installed single in one section with overlap accomplished by master carriers having extension arms by-passing each other. Carriers supplied every 12″. All pulleys are ball-bearing. Maximum overlap 17″. ADC balanced carrier principle. Also available with nylon tire or neoprene tire ball-bearing carriers.

CURVED CYCLORAMA TRACK

FLEX-I-TRAC: A "walk-around" track recommended where it is desirable to increase or decrease the stage size for a variety of settings. Track shape size approximately 1-9/16″ high x 5/8″ wide. Carriers supplied every 9″. Aluminum I-beam channel can be curved on the job to any degree or radius. No cord or pulleys utilized. Carriers of nylon construction; also available in ball-bearing.

ROTODRAPER

A significant new addition to our line, Rotodraper pivot arms enable a change of background curtains to accommodate any stage situation in a matter of minutes. Rotodraper can be used with any of our stage curtain tracks, or is adaptable to individual requirements.

WE ALSO MAKE A CURTAIN MACHINE FOR EVERY PURPOSE



AUTOMATIC DEVICES COMPANY

2121 S. 12th STREET ALLENTOWN, PENNSYLVANIA

Telephone
HEmlock 4-9391

"We Support the Most Celebrated Curtains in the World"

CAPITOL STAGE LIGHTING CO., INC.

527-531 West 45th Street, New York 36, N. Y.

"The Answer to Your Spotlight Problem"



The Capitol

No. 901 Spotlight

This Spotlight affords illumination that is clear, white and without flicker or noise. It can easily be focused from an 18" head spot at 100 feet to flood a full stage with even light at the same distance. Yet it uses only a 1000 or 1500-watt T-20 prefocus-base long-life lamp, obtainable anywhere. It is the ONLY Mazda Spotlight with all these features:

1. Using a 1000 or 1500 watt prefocus projector type bulb with double lens optical system for maximum brightness.
2. Truly round spot of even illumination formed by a precision Iris shutter.
3. Handle for following also instantly adjusts size of spot from head spot to flood.
4. Lever for masking top and bottom of light for special effects or when floodlighting.
5. Six independent colors, fingertip controlled, making possible other colors by combining two or more.
6. Built-in finger-tip controlled dowser for fadeouts—controlling brightness.
7. Convenient built-in double pole switch.
8. Designed for ease of operation and simplicity of control.

Send for your free copy of our latest complete Stage Lighting Catalog.

PRICE, COMPLETE
$250.00
Lamps not included.

Distributed by your Local Dealer

KLIEGL BROS.

321 W. 50 Street, New York 19, N. Y.
Columbus 5-0130

just off the press



ARCHITECTURAL LIGHTING

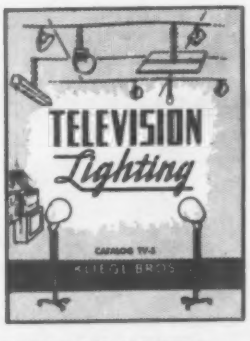
CATALOG NO. A-11

This NEW, 36-page brochure sent on request. Contains application references, illustrations, and latest ideas in lighting fixtures together with dimensional sketches, engineering data, charts, etcetera. Gives complete lighting information on such unusual items as ellipsoidal downlights, shovel lights, pin-holes and the like, as well as lens lights, louvered units and other architectural type fixtures.

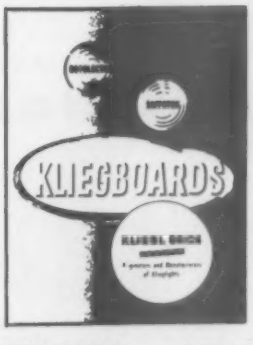
CHURCHES • SCHOOLS • AUDITORIUMS
HOTELS • RESTAURANTS • HOMES



STAGE LIGHTING . . . No. 54 includes all kinds of lighting equipment, apparatus and effects for theatrical purposes.



TELEVISION LIGHTING . . . TV-5 features scoops, spotlights, and special lighting devices developed for video purposes.



KLIEGBOARDS . . . NO 58-3 describes the safe-patch and Rotolector type switchboards also dimming provisions offering improved facilities for control.

HERE'S HELP!

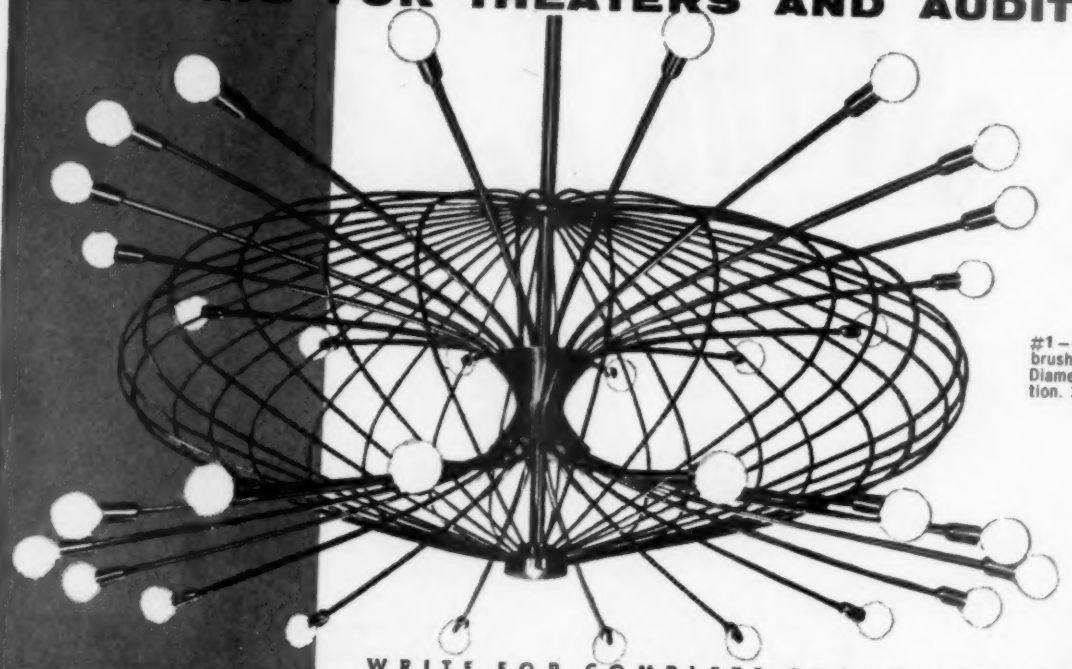
In planning correct lighting facilities for stage and television productions, also fingertip control of lighting schemes. Send for these special catalogs.

GENERAL LIGHTING COMPANY

248 McKibbin Street, Brooklyn 6, N. Y.

Harry Handler, President

LIGHTING FOR THEATERS AND AUDITORIUMS



#1—Decorative chandelier of brushed brass arms and white cup. Diameter 4', 6", length to specification. 32 candelabra base lamps.

WRITE FOR COMPLETE CHANDELIER FOLIO #355.

"FLEXIBLE" lighting for stage,



The Trol-E-Duct lighting track is a standardized and prefabricated wiring system that is used in many TV studios where lighting must be flexible. The lighting fixtures shown on these pages snap into the track. A quarter turn connects the fixture to the track mechanically and electrically. Not only can individual lighting fixtures be rearranged at will, the entire system can be altered or completely dismantled and installed elsewhere without loss of any of its components without expensive changes in existing wiring.

WRITE FOR COMPLETE FLEXIBLE LIGHTING TRACK FOLIO #285.

lighting for classrooms, corridors,



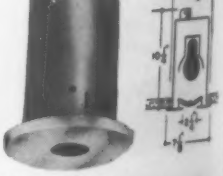
Recessed Square Lens Fixtures.
908—6" Sq. Lens, 100W.
909—8" Sq. Lens, 150W.
910—12" Sq. Lens, 300W.
With spread fresnel lens. Hinged door and trim in baked-on white finish.



Recessed Round Lens Fixtures.
911—6" Round Lens, 100W.
912—8" Round Lens, 150W.
913—12" Round Lens, 300W.
Wide spread fresnel lens. Baked on white enamel door.



Recessed Baffled Downlight.
914—for R-40/PAR 38-150W. Projector lamp. 12" deep, 8" dia.
915—for R-52 500 or 750W. Projector lamp. 18" deep, 11" dia.
For use in high ceilings.



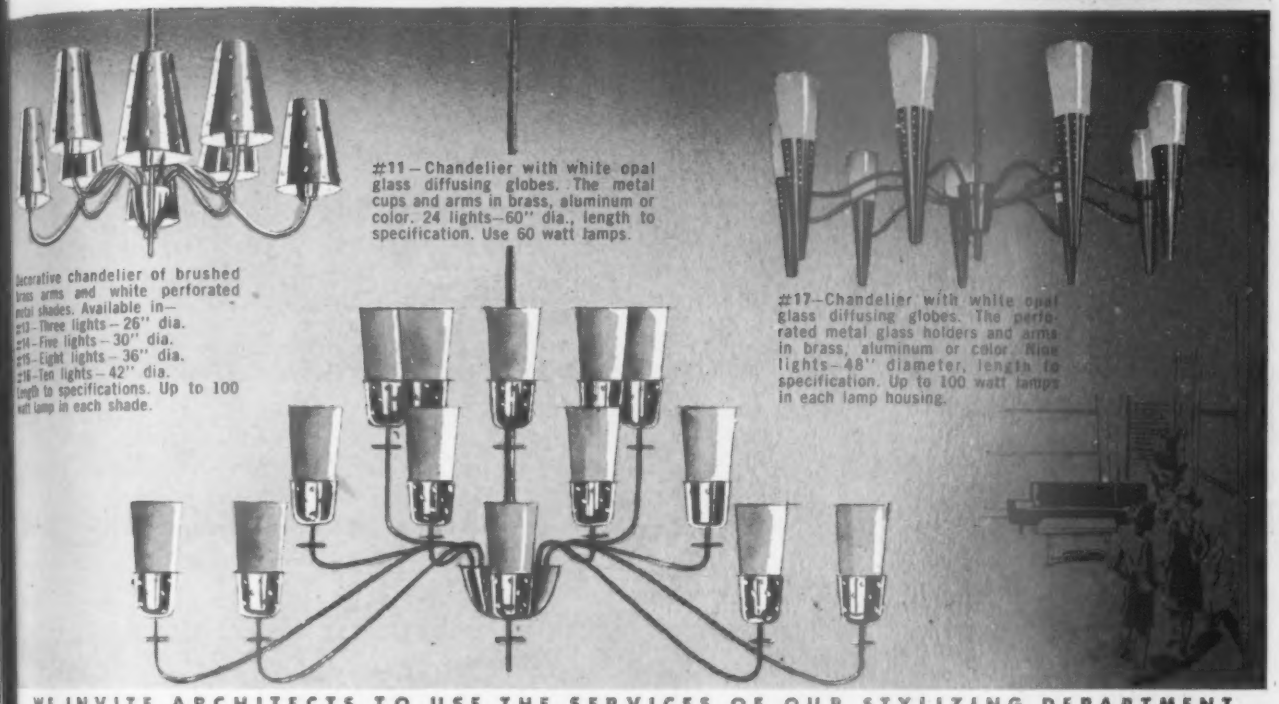
Recessed Fixture
916—Adjustable Focus Lens Fixture. Door sprayed White Enamel finish. Use up to 100 Watt lamp.

SEND FOR COMPLETE CATALOG WITH COLOR CHART

GENERAL LIGHTING COMPANY

248 McKibbin Street, Brooklyn 6, N. Y.

Harry Handler, President



Decorative chandelier of brushed brass arms and white perforated metal shades. Available in—
#13—Three lights—26" dia.
#14—Five lights—30" dia.
#15—Eight lights—36" dia.
#16—Ten lights—42" dia.
Length to specifications. Up to 100 watt lamp in each shade.

#11—Chandelier with white opal glass diffusing globes. The metal cups and arms in brass, aluminum or color. 24 lights—60" dia., length to specification. Use 60 watt lamps.

#17—Chandelier with white opal glass diffusing globes. The perforated metal glass holders and arms in brass, aluminum or color. Nine lights—48" diameter, length to specification. Up to 100 watt lamps in each lamp housing.

WE INVITE ARCHITECTS TO USE THE SERVICES OF OUR STYLIZING DEPARTMENT.

art classes, music rooms etc....



4642—Lighting track fixture with universal swivel joint. The fixture is adjustable for use with lamps from 75W. R-30 to 500W. R-40.



4613—Lighting track fixture with medium base porcelain socket and universal swivel. For use with all medium base reflector and projector lamps.



Lighting track fixture with universal swivel joint.
4632—For 200W. PAR-46 Projector lamp.
4633—For 300W. PAR-56 extremely powerful Projector lamp.



4639—A decorative lighting track fixture that provides indirect as well as direct light. With decorative perforations.

WRITE FOR COMPLETE FLEXIBLE LIGHTING TRACK FOLIO #255.

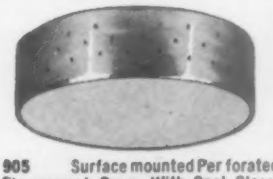
cafeterias, libraries, lecture rooms, etc.



Recessed Adjustable Fixture.
917—Kotobeam 350 Horizontal adjustment, 45 Vertical adjustment. For use with 150 Watt Reflector lamps.



Semi-Recessed Adjustable Fixture.
918—Eye Ball Action—360 horizontal adjustment. 45 Vertical adjustment. Baked White trim, Satin Chrome Ball. For use with 150 Watt PAR 38 Reflector lamp.



905 Surface mounted Perforated Fluorescent Drum With Opal Glass. Economy of operation and long life are inherent in this fixture where 24 hours a day light is required. For use with 22 Watt Circline Fluorescent lamp.

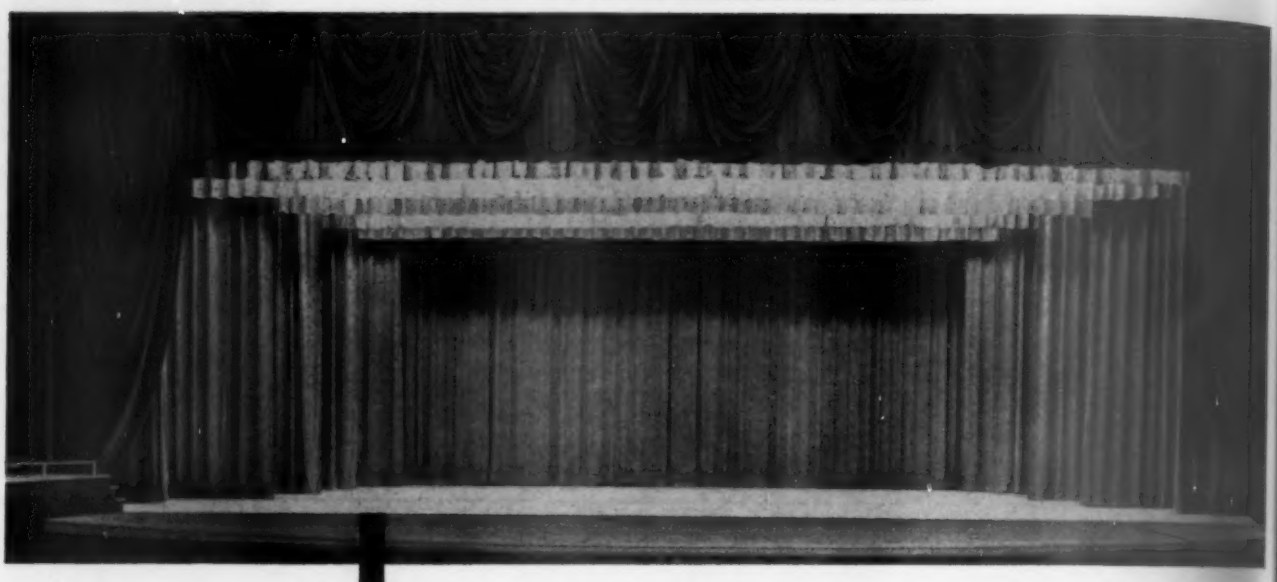


920—Dome lights up to 72" Dia. Send for special dome light catalog.

LIGHTING OVER 400 LIGHTING FIXTURES AND CHANDELIERS.

KNOXVILLE SCENIC STUDIOS INCORPORATED

Maryville Pike at Woodson Drive, Knoxville, Tenn.



COMPLETE STAGE EQUIPMENT SERVICE

DESIGNING
FABRICATION
ERECTION

- Asbestos Curtains and Rigging
- Picture Screens and Frames
- Traverse Track Systems
- Revolving Stages
- Stage, Console or Orchestra Lifts
- Stage Curtains and Draperies
- Cycloramas
- Window and Auditorium Drapes
- Fireproof Fabrics and Wall Covering
- Painted Scenery Sets and Properties

Artistry that sets the stage!

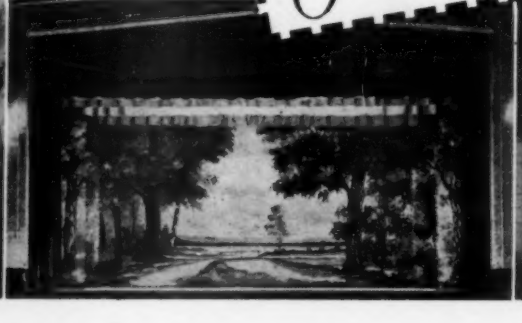
Auditorium, high school, theatre . . . whatever your requirements—we offer you the service of a nationwide organization of representatives backed by trained specialists in one of America's most modern and completely equipped scenic studio facilities. Estimates and engineering counsel are available to prospective buyers without obligation. We invite your inquiry.

EVERYTHING FOR THE STAGE BUT THE PLAYERS

KNOXVILLE Scenic Studios INCORPORATED

Maryville Pike at Woodson Drive Knoxville, Tenn.

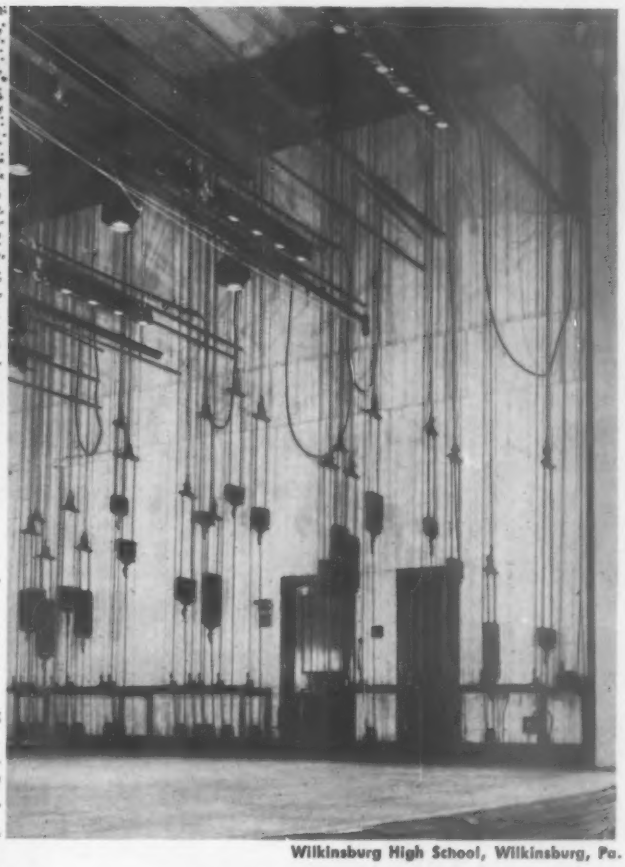






PITTSBURGH STAGE, INC.

2705 No. Charles St., Pittsburgh 14, Penna.



Wilkinsburg High School, Wilkinsburg, Pa.

Recent Educational Installations by Pittsburgh:

OBERLIN COLLEGE
OBERLIN, OHIO

WILKINSBURG HIGH SCHOOL
WILKINSBURG, PA.

PORTAGE HIGH SCHOOL
PORTAGE, MICHIGAN

MADISON HIGH SCHOOL
MADISON, N. J.

TOWSON STATE TEACHERS COLLEGE
TOWSON, MD.

UNIONTOWN HIGH SCHOOL
UNIONTOWN, PA.

BENSON ELEMENTARY SCHOOL
BENSON, ARIZONA

CLIFTON HIGH SCHOOL
CLIFTON, ARIZONA

ELDORADO HIGH
ELDORADO, KANSAS

CAMBRIDGE HIGH
CAMBRIDGE, IOWA

LEWISTON HIGH
LEWISTON, NEBRASKA

MAGNOLIA HIGH
MAGNOLIA, IOWA

WASHBURN RURAL HIGH
TOPEKA, KANSAS

STORY CITY SCHOOL
STORY CITY, IOWA

FOR VERSATILE ALL-PURPOSE STAGING DESIGNED TO YOUR BUDGET

"Consult Pittsburgh"

Our Curved Cyclorama Tracks create beautiful stage settings that can be converted quickly and easily from a large area to a smaller unit for one-act plays - - or cleared for other uses.

Let us design a modern, dramatic stage setting that can be quickly and easily adapted to your every need.

VELOUR CURTAINS
CONTOUR CURTAINS
ASBESTOS CURTAINS
AUDITORIUM CURTAINS
STAGE RIGGING
STAGE HARDWARE
STAGE LIGHTING
CURTAIN TRACKS
INTERIOR FLATS
WOODLAND SCENES
CYCLORAMAS
CURVED TRACKS

Write for free consultation or additional information.

Pittsburgh Stage Inc. **2705 No. Charles St. Pittsburgh 14, Penna.**

THE STRONG ELECTRIC CORPORATION

"The World's Largest Manufacturer of Projection Arc Lamps"

124 City Park Avenue — Toledo 2, Ohio

Strong SPOTLIGHTS



TROUPER HIGH INTENSITY ARC SPOTLIGHT

for large auditoriums.

Adjustable, self-regulating transformer in base. Automatic arc control. A trim of carbons burns 80 minutes.

AVAILABLE WITH SLIDE PROJECTOR ATTACHMENT FOR VISUAL EDUCATION.

THE ONLY SPOTLIGHTS WITH ALL THESE ADVANTAGES

A REALLY BRIGHT, QUIET, FLICKERLESS LIGHT.
A SHARP EDGE FROM HEAD SPOT TO FLOOD.
REQUIRES NO HEAVY ROTATING EQUIPMENT. SIMPLY PLUG INTO 110-VOLT OUTLET.
TRUE PORTABILITY. MOUNTED ON CASTERS.
TWO ELEMENT VARIABLE FOCAL LENGTH OBJECTIVE LENS SYSTEM.
SILVERED GLASS REFLECTOR. HORIZONTAL MASKING CONTROL CAN BE ANGLED 45 DEGREES IN EACH DIRECTION. FAST OPERATING 6-SLIDE COLOR BOOMERANG.



TROUPERETTE INCANDESCENT SPOTLIGHT

for small auditoriums.

Projects 6½ times brighter head spots. Utilizes all the light through most of the spot sizes as contrasted to spotlights which vary spot size solely by irising, thus losing substantial light.

WARD LEONARD ELECTRIC COMPANY

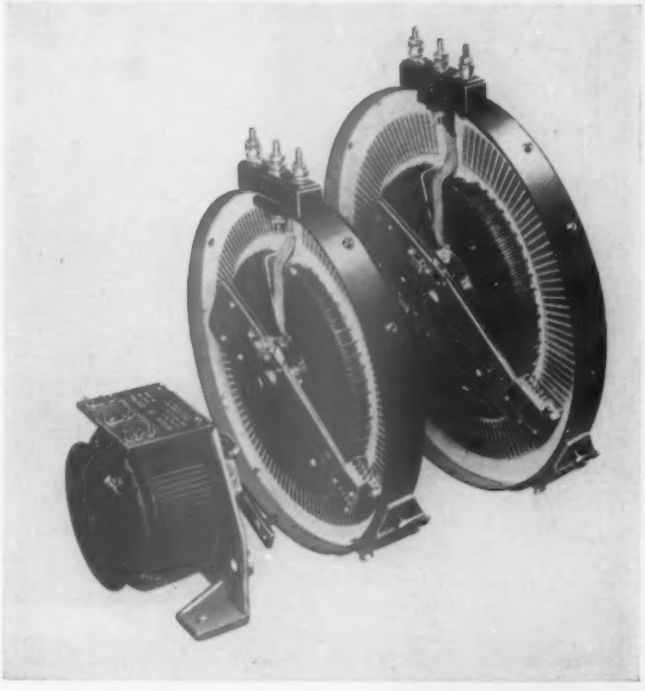
13 South Street, Mount Vernon, N.Y.

How to get the right dimmer for any lighting control

• Select lighting controls for your theater, auditorium, school, church or hall from Ward Leonard's complete line.

We are the only manufacturer offering *all* types of dimmers – reactance, resistance and auto-transformer, both manual and remote.

Send us complete information about your dimming installation problem. Our engineers will be glad to recommend the proper controls for your requirements. Ward Leonard Electric Co., 13 South St., Mount Vernon, N.Y.



AUTO-TRANSFORMER DIMMERS

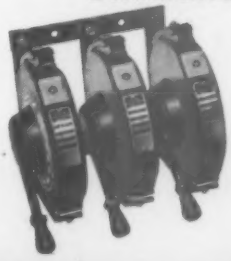
AUTO-TRANSFORMER DIMMERS come in 2500, 6000 and 8000 watt sizes, 120 volts, 60 cycles A.C. Foolproof dimmers, capable of operating singly or in many combinations with interlocking to common master systems. Exclusive features include silver-surfaced brush track for low contact resistance and long, trouble-free life. Complete details in Bulletin 76.

REACTANCE DIMMERS



WARD LEONARD'S HYSTERSET DIMMER. New electronic circuits, using small current values and miniature control devices, permit grouping many dimming and switching controls in single control board for one-man operation. Various circuits can be interlocked electronically. Pre-set control permits pre-selection of two or more lighting combinations or scenes in advance. Write for Bulletin 74.

RESISTANCE DIMMERS



WARD LEONARD'S VITROHM. Inexpensive assemblies for small theaters and auditoriums, schools, churches, and lodge rooms provide low-cost, flickerless dimming. Non-interlocking, single- or multi-plate assemblies: Bulletin 71. Interlocking assemblies with group, color and grand master control: Bulletin 72.

WARD LEONARD ELECTRIC COMPANY
MOUNT VERNON, NEW YORK

RHEOSTATS · RESISTORS · RELAYS · MOTOR CONTROLS · DIMMERS · CHROMASTER

Result-Engineered Controls Since 1892

I. WEISS and SONS

Established 1900

445 W. 45th Street, New York 19, N. Y.

Telephone: Circle 6-8444

STAGE EQUIPMENT

services

Asbestos curtains
Counterweight systems
Track
Wire Guide
Stage Curtains and scenery
Projection Screens
Electrical equipment for the stage
Noiseless tracks
Automatic controls
Acoustical wall covering
Cycloramas
Curtains
Draperies
Non-combustible
and flameproof fabrics.

consulting and designing

Consultation service for stage layouts, riggings and curtain problems is available without obligation. Experienced advice for providing conditions and equipment most practical for your purpose can be obtained easily and quickly. Send your plans to us or have one of our representatives call regarding your special problems.

estimates

Specifications and prices are prepared and submitted upon request.

manufacturing

All material recommended by us is the best of its type, fabricated into efficient equipment, fully guaranteed to provide the maximum of satisfaction. Our labor is performed by highly skilled persons employed by us for years in this specialized field.

installing

All installations are made by skilled mechanics, fully qualified and experienced to perform their jobs in a thorough workmanlike manner. Many years of performance of our installations speak for our type of service, integrity and quality of our products.

Wantagh High School, Wantagh, N. Y.

Curtain made to operate across circular shaped Proscenium from wall to wall of auditorium. Architect: Fred P. Weidersum.





Wantagh High School, Wantagh, N. Y.

Same auditorium as above with stage curtain drawn revealing the drapery stage set.

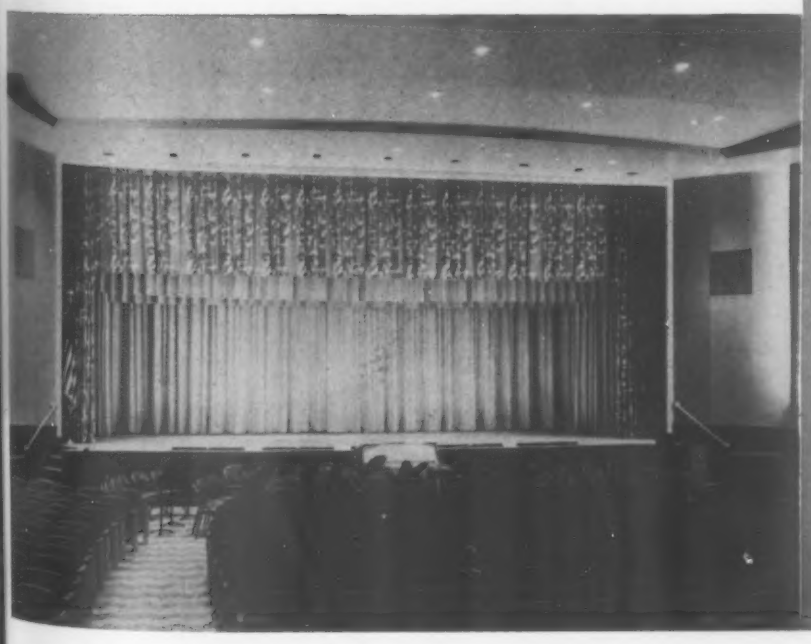
I. WEISS AND SONS



East Meadow High School, East Meadow, N. Y.

Stage Equipment installation showing Proscenium Curtain full length and in closed position. Architect: Fred P. Weidersum.

Same auditorium as above with stage curtain drawn revealing the drapery stage set.



a few clients and installations

architects

Eggers & Higgins
Everett Associates
Hacker & Hacker
Reginald Marsh
Shreve, Lamb & Harmon
Starret & Van Vleck
Voorhees, Walker, Foley & Smith
Frederic P. Weidersum
Joseph Wigmore
Wolfe & Holm

schools and colleges

Hunter College	New York, N. Y.
George Washington University	Washington, D. C.
Jefferson High School	Rochester, N. Y.
Glen Cove High School	Glen Cove, N. Y.
New High School Bldg.	Thomaston, Conn.
University of Pennsylvania	Philadelphia, Pa.
Trenton, N. J.	Board of Education
Elizabeth, N. J.	Board of Education
Montclair, N. J.	Board of Education
New York City	Board of Education
Wantagh High School	Wantagh, N. Y.
East Meadow High School	East Meadow, N. Y.

institutions

Queens County Court House	Jamaica, N. Y.
Jersey City Medical Center	Jersey City, N. J.
Matawan State Hospital	Matawan, N. Y.
Pilgrim State Hospital	Brentwood, N. Y.
Sing Sing Prison	Ossining, N. Y.

government

United States	Gloucester, Mass.
State of New York	Medford, Mass.
City of New York	Trenton, N. J.

international

Palacio Nacional de Guatemala	C. A.
Theatres in the Dominican Republic	C. A.

stage designers

Boris Aaronson	Lemuel Ayres
Howard Bay	Stewart Chaney
The Eckart's	Frederick Fox
Norman Bel Geddes	George Jenkens
Samuel Leve	Raymond Loewy
Jo Mielziner	The Motley's
Donald Oenslager	Lee Simonson
Raymond Sovey	

theatres

Radio City Music Hall	New York, N. Y.
Radio City Center Theatre	New York, N. Y.
Billy Rose's Ziegfeld Theatre	New York, N. Y.
46th St. Theatre	New York, N. Y.
Florida Theatre	Florida
Carolina Theatre	Charlotte, N. C.

stage productions (recent)

South Pacific	Death of a Salesman
Fanny	Kiss Me Kate
Can Can	Damn Yankee
Plain & Fancy	King & I
A Streetcar Named Desire	

GROGG BROS. MFG. CO.

Spring Grove, Pa.

FOLD-AWAY FOLDING TABLES AND BENCHES



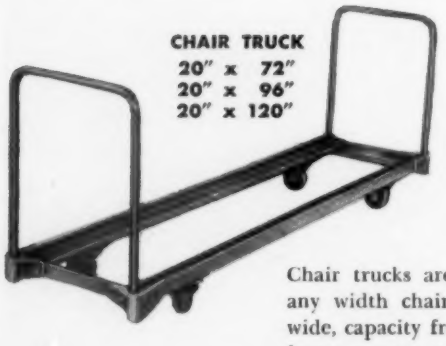
- **Sturdy**
- **Easy to Store**
- **Easy to Clean**

Construction Details:

Top 3/16" Tempered Masonite.
Apron 18 Gauge Cold Rolled Steel.
Leg 16 Gauge 1" O.D. Cold Rolled Steel Tubing, Acetylene Welded.
Frame 5/8" 5-Ply Fir Plywood 4" Wide.
Molding Extruded Aluminum "T".
Positive Locking Device (Extra Heavy Aluminum Casting).
Clips—18 Gauge 1" Wide, held by four No. 8 x 5/8 Wood Screws.
Floor Glides—Extra Heavy Steel, Chrome Plated.

Folding tables, like most other manufactured articles, have gone through a process of evolution. For years we have manufactured folding tables, and have noted the changes made and the reasons for such changes. Here we present what we consider the best line of folding tables on the market, giving due consideration to sturdiness of design, finish, materials used, and all factors involved. For use in an institution, folding tables, made by Grogg Bros. of Spring Grove, Pa., will meet all reasonable expectations and give long years of satisfactory service.

A choice of tops—Plastic, Masonite, Fir, and Birch Plywood and Linoleum



CHAIR TRUCK
20" x 72"
20" x 96"
20" x 120"

Contact your nearest dealer or write for brochure and price list.

Chair trucks are designed to hold any width chair from 15" to 18" wide, capacity from 30 to 45 chairs, frame constructed of heavy steel formed channel electric welded, equipped with 4—4" Bassick swivel casters, and 4 aluminum casting corners for holding handles.

ROLL-AWAY CHAIR AND TABLE TRUCKS

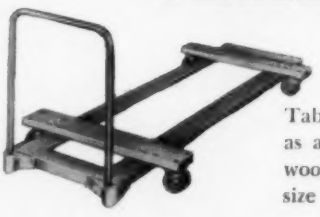


TABLE TRUCK 30" x 72"

Table trucks are designed the same as a chair truck with 2–1⅛" x 4" wood battons, will handle 12 any size tables.

A choice of territories open to dealers

American Seating Company

D-3/AmS

Universal Desks & Unit Tables

with

AMEREX

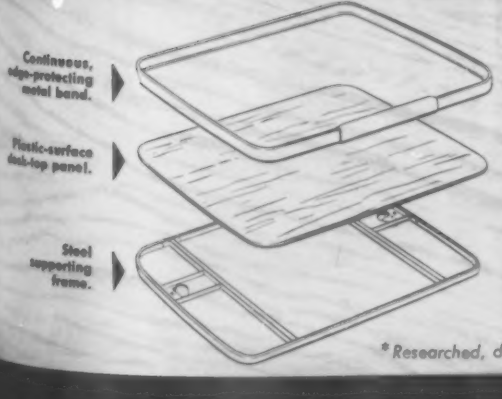
the first and only

Metal-and-Plastic Top





- Save floor space—less sitting area required per pupil.
- Aid in furniture quietness and classroom order.
- Sturdy, die-formed steel construction.
- UNIVERSAL DESKS improve teacher guidance and student learning . . . Develop good posture through functional design and size adjustment . . . Increase teaching flexibility through use in groups or rows.
- UNIT TABLES in three models, with functional features to fit every classroom need . . . New, large, metal glides for greatest floor protection.



New AMEREX*

METAL-AND-PLASTIC TOP

Adds years of "wear-life" to Universal Desks and Unit Tables. Stronger, yet lighter in weight than ordinary plastic tops. A die-formed, welded steel frame supports the work surface, which is five times more wear-resistant than wood finishes. Ends all warping, checking, splitting hazards. Satin-smooth plastic surface has color-fast birch-grain pattern, controlled 45% light reflectance, is free of irregularities. Continuous metal band protects all edges.

*Researched, designed and manufactured by American Seating Company.

American Seating Company • Grand Rapids 2, Michigan

Manufacturers of School, Auditorium, Church, Theatre, Transportation, Stadium Seating, and FOLDING CHAIRS

Leading the school seating industry for 69 years, American Seating Company has pioneered many improvements in school furniture which have since become the accepted standard. Continuous research and rigid inspection procedures safeguard the quality of all American Seating products. Finest materials and most modern methods insure the true economy found only in long, dependable service. Buy any of these products with confidence of satisfaction.

American Universal "Ten-Twenty" Desk No. 536

with famous 3-position use of new AMEREX metal-and-plastic top

The only desk with a top adjustable, easily, to *three* positions: 20° slope for easier reading, writing, drawing — conventional 10° slope — and level for manipulative tasks, group discussions. Exclusive, *automatic fore-and-aft* seat adjustment insures proper focal distances for all tasks.

Other Advantages

Continuous cradleform sitting comfort. 45° left-and-right seat swivel for getting in or out either side. Deep-curved back with self-adjusting lower rail that fits each occupant. Wide-range adjustability by never-fail, wrap-around clamps. Roomy, sanitary, one-piece steel book-box with smooth, rounded edges. Full-length pencil tray inside box. (Inkwell is optional.) Sizes to accommodate all grades — and adults.



American Universal Lifting-Lid Desk No. 534

with AMEREX metal-and-plastic top

The ONE-PIECE TOP affords completely usable work-surface at either 10° slope or level position. Entire top lifts for full access to roomy, one-piece steel book-box. No-slam hinges hold top fully open, provide friction adjustability and operate silently.

Other Advantages

Pencil tray on top as well as inside desk-top. Same long-life, die-formed construction, wide range adjustability, seat swivel, and comfort-contoured back with adjustable rail as in No. 536. Sizes to fit all grades — and adults. Both No. 536 and No. 534 help improve student-learning performance, maintain order and quietness, save floor space, afford utmost stability, permit flexibility of arrangement. Choose the one that best fits your needs.

Send for fully descriptive folder on American Universal Desks



Copyright 1955, American Seating Co

American Seating Unit Tables

with **AMEREX** metal-and-plastic tops

Sturdy, twin, oval steel standards assure table stability, permit students to get in or out with minimum chair-scraping noise, and save floor space by allowing closer spacing of units. Large metal glides provide greatest floor protection. (Inkwells optional.)



No. 528 with "Ten-Twenty" Top (See details of No. 536 desk-top at left)

Send for fully descriptive folder on American Seating Unit Tables

Only American Seating offers this choice of three functional, economical unit tables.



No. 524 with Lifting Lid



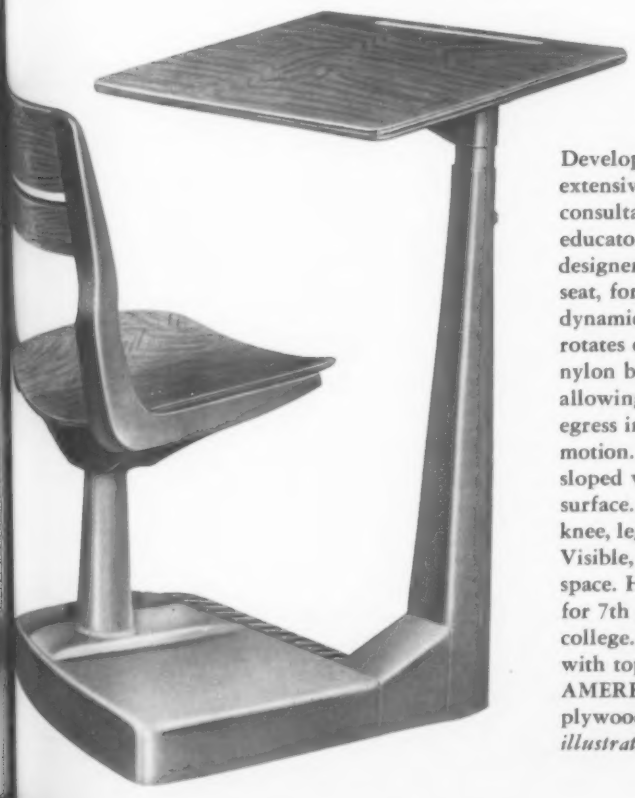
No. 329 with Open Front. AMEREX Hard-Core Plastic Top

Level top, 18 x 24" with edges extended permits placing tables together for group activity. Open-front, steel book-box has full-length pencil tray inside.

American Seating High-School and College Desk

No. 445

Modern Styling • Greatest Student Comfort
Steel Pylon Construction



Developed through extensive research and consultations with educators, architects, designers. Cradleform seat, for comfortable dynamic posture, rotates on silent, nylon bearings — allowing ingress and egress in one natural motion. Adequate, sloped working surface. Generous knee, leg, body room. Visible, handy book space. Height range for 7th grade through college. Available with top of hard-core AMEREX, or of plywood. *Send for illustrated folder.*

L-shaped, Trapezoidal, Rectangular

FLEXI-TABLES

(AMEREX Hard-Core Top; or Plywood)



No. 115, L-shaped, with 48" lengths, 24" sides. Can be grouped in "horse shoe" or other arrangements—practical for "extra corners."



No. 116, 24" wide x 35" x 48". Permit space-saving use along walls, other areas. Only Flexi-tables provide maximum work-surface with minimum floor space.

No. 131—(Not illus.) Rectangular—24 x 48"

American Universal Adjustable Tables No. 132

Sizes for kindergarten through college — also cafeterias, dormitories, libraries. Steel standards have knee-action leveling and adjusting device.



Plywood of American tables and chairs is hot-press, urea-resin bonded.

American Envoy
Posture Chair No. 368



All-purpose chair, designed for good-posture sitting, best economy. Monosteel frame, multiple welded for great strength — no rivets, no squeaks. Formed plywood seat, deep-curved back with self-adjusting lower rail. Hardened steel, rubber-cushioned glides. Plywood seat and back. Seat heights: 11, 13, 15, 17".

American Envoy
Tablet-Arm Chair No. 380



Like No. 368 chair, this unit is designed for good-posture sitting and economy. Same floor-protecting glides. The tablet-arm is sloped 3¼" for comfortable writing. Roomy, sanitary book cabinet. Enclosure panel on occupant's right is optional. Seat height, 17" only. Also available: No. 378—without the book cabinet.

American Envoy
Desk No. 352



Strongest, most comfortable desk of its type; top slopes 10° for writing efficiency. Strong desk support and wrap-around clamp for quick height adjustment of top. Roomy, sanitary book cabinet with all-purpose book-guard on occupant's right. Hardened steel rubber-cushioned glides. Available in seat heights of 13, 15, 17".



University-Type Pedestal Tables
with No. 406 Pedestal Chairs

In straight rows or on a radius, provide continuous plywood working surfaces — for large or small rooms, level or sloping floors, with or without risers. Two-pupil sections, 54" long, 16 to 24" wide, 29" high. Offset pedestals leave ample leg room.



Pedestal Tablet-Arm Chair No. 472

Cradleform, plywood seat is 17" high, with closed, deep-curved back. Tablet-arm is sloped 3¼" for writing comfort. Oval steel pedestal. University-size seat is 15½ x 17½". Metal book-rack is optional. Chair No. 471 identical except has open back, with self adjusting lower rail.



All-Purpose Folding Chair No. 54

Comfortable, durable — for assembly halls, cafeterias, gyms, etc. Frame, reinforced triangular steel tubing; shaped plywood seat. Metal parts Bonderized; 2 enamel coats; tread-rubber feet. Folds quietly, compactly. (With shaped-steel or upholstered seats, Nos. 53 and 56.)



Bodiform Auditorium
Chair No. 16-001

Combines beauty, comfort, roominess. Automatic ¾ safety-fold seat action—more room for passing, cleaning. No pinching, tearing hazards. Upholstery easily replaceable. (Other American auditorium chairs: with plywood back and seat; semi-upholstered; and with tablet-arm.)

Desk-top and tablet-arms available in either AMEREX hard-core plastic, or plywood.

American Seating Company • Branch Offices and Distributors

ALABAMA — MONTGOMERY
American Seating Company
Warren Reese, Sr. Bldg.,
335 Dexter Ave.

ARIZONA — PHOENIX
PBSW Supply & Equipment Co.
530 W. Washington St.
(Also Branches at Flagstaff, Mesa, Prescott, Safford, Tucson, Yuma)

ARKANSAS —
For Information or Service write
School Products Company
357-359 Madison Ave.
Memphis 3, Tenn.

CALIFORNIA — LOS ANGELES 3
American Seating Company
6900 Avalon Blvd.

SAN FRANCISCO 24
American Seating Company
701 Bayshore Blvd.

COLORADO — DENVER 17
Centennial School Supply Co.
P.O. Box 5224, Terminal Annex

CONNECTICUT —
Write New York, N. Y. Office for Information or Service

DELAWARE —
Write Philadelphia, Pa. Office for Information or Service

DISTRICT OF COLUMBIA —
Write New York, N. Y. Office for Information or Service

FLORIDA —
Write Atlanta, Ga. Office for Information or Service

GEORGIA — ATLANTA 3
American Seating Company
354 Nelson St., S. W.

IDAHO — BOISE
Northern School Supply Co.
1114 North 21st St., Box 2613

ILLINOIS — CHICAGO 2
American Seating Company
173 W. Madison St.

PONTIAC
Everett M. Bailey, 306 Indiana Ave.

ROCK ISLAND
A. M. Blood Company, 326 20th St.

SYCAMORE
I. A. Bock School Service, 628 Park Ave.

INDIANA — INDIANAPOLIS 2
Kiger & Company, Inc.
1830 W. 16th St.

IOWA — CEDAR RAPIDS
Metropolitan Supply Company
602-616 Third St., S. E.

KANSAS —
Write Chicago, Ill. Office for Information or Service

KENTUCKY — LOUISVILLE 2
Central School Supply, Incorporated
311 W. Main St.

LOUISIANA — NEW ORLEANS 12
F. F. Hansell & Bro., Ltd.
131 Carondelet St.

MAINE —
Write Boston, Mass. Office for Information or Service

MARYLAND — BALTIMORE 2
The James T. Vernay & Sons Co.
5 E. Lexington St.

MASSACHUSETTS — BOSTON 16
American Seating Company
131 Clarendon St.

CAMBRIDGE 42
J. L. Hammett Company, Kendall Sq.

MICHIGAN — DETROIT 35
American Seating Company
16159 Meyers Rd.

GRAND RAPIDS 2
American Seating Company
901 Broadway, N. W.

LANSING 2
Michigan School Service, Inc.
312-314 N. Grand Ave.

MARQUETTE
Upper Peninsula Office Supply Co.

MINNESOTA — ST. PAUL 1
St. Paul Book & Stationery Co.
55 E. Sixth St.

MISSISSIPPI — JACKSON 5
Mississippi School Supply Co.
116 E. South St.

MISSOURI — KANSAS CITY 6
Hoover Brothers, Inc., 1020-22 Oak St.

ST. LOUIS
American Seating Company
4053 Lindell Blvd. (Zone 8)

Blackwell Wielandy Co.
1605 Locust St. (Zone 3)

MONTANA — GREAT FALLS
Northern School Supply Co.
First Ave., N., and G. N. Tracks

NEBRASKA —
Write Chicago, Ill. Office for Information or Service

NEVADA — RENO
Armanko Office Supply Co.
152 N. Virginia St.

NEW HAMPSHIRE —
Write Boston, Mass. Office for Information or Service

NEW JERSEY —
Write Philadelphia, Pa. Office, or New York, N. Y. Office for Information or Service

NEW MEXICO — ALBUQUERQUE
Wentworth Company, P.O. Box 577

NEW YORK — NEW YORK 19
American Seating Company
1776 Broadway

SYRACUSE 4
American Seating Company
923 W. Genesee St.

NORTH CAROLINA — RALEIGH
Universal Equipment Company
Drawer 10127, Cameron Village Branch

NORTH DAKOTA — FARGO
Northern School Supply Co.
8th St. & Northern Pacific Ave.

OHIO — CLEVELAND 9
American Seating Company
1619 Brookpark Rd.

COLUMBUS 12
The Dobson-Evans Company
1100 W. Third Ave.

OKLAHOMA — OKLAHOMA CITY 2
The Oklahoma Seating Company
19 W. Main St.

OREGON — PORTLAND 9
Northern School Supply Co.
1505 N. W. Lovejoy St.

PENNSYLVANIA — PHILADELPHIA 30
American Seating Company
16th at Hamilton

PITTSBURGH 22
American Seating Company
212 Oliver Ave.

RHODE ISLAND —
Write Boston, Mass. Office for Information or Service

SOUTH CAROLINA — COLUMBIA
American Seating Company
928 Main St.

SOUTH DAKOTA — SIOUX FALLS
Sioux Falls Book & Stationery Co.
117-119 N. Phillips Ave.

TENNESSEE — CHATTANOOGA 2
Highland Products Co.
236 Chamberlain Bldg.

KNOXVILLE 8
Highland Products Co.
720 S. Gay St.

MEMPHIS 3
School Products Company
357-359 Madison Ave.

NASHVILLE 3
Nashville Products Company
158 Second Ave., N.

TEXAS — DALLAS 26
American Seating Company
2930 Canton St.

HOUSTON 3
American Seating Company
1703 Bell Ave.

UTAH — SALT LAKE CITY 1
Utah-Idaho School Supply Co.
155 S. State St.

VERMONT —
Write Boston, Mass. Office for Information or Service

VIRGINIA — RICHMOND 20
J. H. Pence Company, P.O. Box 9[illegible]

ROANOKE 5
J. H. Pence Company, P.O. Box [illegible]

WASHINGTON — SEATTLE 1
Northern School Supply Co.
2603 First Ave.

SPOKANE 1
Northern School Supply Co.
North 1118 Washington St.

WEST VIRGINIA — HUNTINGTON
West Virginia Seating Company
837-839 Second Ave.

WISCONSIN — EAU CLAIRE
Eau Claire Book & Stationery Co.
320 Barstow St., S.

MILWAUKEE 14
Eau Claire Book & Stationery Co.
4610 W. Mitchell St.

WYOMING —
Write San Francisco, Calif. Office for Information or Service

CANADA —
Christie School Supply, Ltd.
P.O. Box 300, Brandon, Manitoba

Globe Furniture Company, Ltd.
Shantz Ave., Waterloo, Ontario

HAWAII —
Roy C. Pullen Company
Box 5356, Pawaa Sta.
Honolulu 14, Oahu, T.H.

EXPORT OFFICE —
American Seating Company
1776 Broadway, New York 19, N.

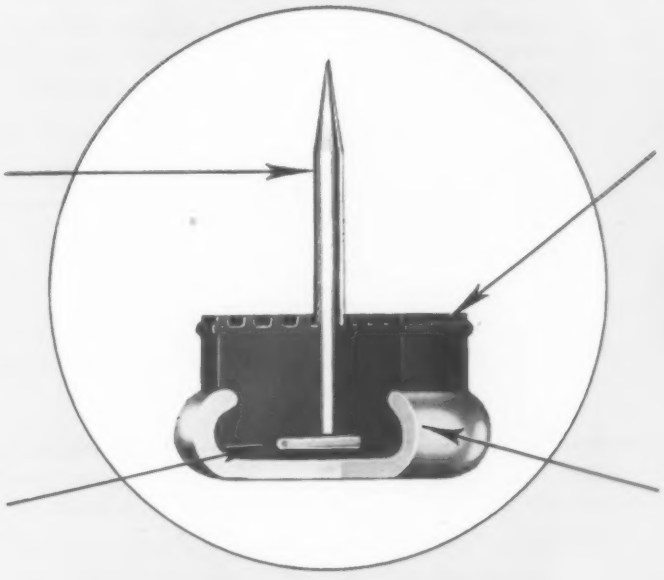
Bassick

GLIDES AND CASTERS FOR SCHOOLS

FOR

QUIETNESS
EASY ACTION
FLOOR PROTECTION

Every piece of School furniture needs RUBBER CUSHION GLIDES



DRIVE NAIL, ... ATTACHMENTS AVAILABLE FOR ALL TYPES OF FURNITURE.

RESILIENT RUBBER CUSHION

SPECIAL LARGE NAIL HEAD . WHEN APPLIED DOES NOT CONTACT METAL BASE.

EXTRA HEAVY GAUGE FLAT STEEL BASE . . . FULLY HARDENED FOR LONG WEAR.

CATALOG NO. ASU-53

Rolly Bassick

TRADE MARK

Bassick "BASGO" RUBBER CUSHION GLIDES

NAIL TYPE FOR WOOD



Constructed with a heavier gauge flat steel base having a greater degree of hardness than competitive glides, providing longer life and easier sliding qualities. A live rubber cushion affords complete cushioning and maximum quietness. NO METAL TO METAL CONTACT BETWEEN BASE AND NAIL WHEN APPLIED.

Recommended for use on chairs, tables and other pieces of furniture where protection of floors, easy sliding and elimination of noise is desirable. Ideal for use on hard surface floors (tile, concrete, terazzo, wood, etc.) and all composition floor coverings.

The sharp nail drives easily. When being applied to small legs or in hard wood, a slight lead hole will facilitate the installation.

SPECIFICATIONS

Base Diam.	Catalog Numbers		Size recommendation — use the size with the largest diam. base the leg will accommodate, for greatest floor protection especially on linoleum, asphalt tile or other resilient floor coverings.	Unit Packing		Carton Packing	
	Nickel Finish	Stainless Steel		Sets Per Box	Weight Per Box	Boxed Sets	Gross Weight
7/8"	CG-90	CG-90SS		6	3/4 lb.	180	20 lbs.
1 1/16"	CG-91	CG-91SS		6	1 lb.	108	20 lbs.
1 1/4"	CG-92	——		6	1 lb.	72	15 lbs.
1 1/2"	CG-93	——		3	7/8 lb.	36	15 lbs.

SOCKET TYPE FOR WOOD



These glides are for use where chairs and other furniture have already been equipped with gripneck caster sockets. It is an easy matter to remove the caster and insert these quiet, easy sliding rubber cushion glides.

Constructed with a heavier gauge flat steel base having a greater degree of hardness than competitive glides, providing longer life and easier sliding qualities. A live rubber cushion affords complete cushioning and maximum quietness.

SPECIFICATIONS

Base Diam.	Catalog Numbers	Socket Data			Standard Finish	Unit Packing		Carton Packing	
		Bore Diam.	Bore Depth	Standard Socket		Sets Per Box	Weight Per Box	Boxed Sets	Gross Weight
1 1/4"	CG-392	3/8"	1 1/2"	No. 3 1" Track Plate	Nickel	1	7 oz.	25	12 lbs.
1 1/2"	CG-393	3/8"	1 1/2"			1	9 oz.	25	15 lbs.

MACHINE SCREW TYPE FOR METAL



SAME CONSTRUCTION AS NAIL TYPE SHOWN ABOVE EXCEPT WITH 8-32 MACHINE SCREW STEM PROJECTING 3/8" ABOVE RUBBER CUSHION.

FURNISHED STANDARD WITH NUT AND LOCK WASHER. WHERE THESE ARE NOT REQUIRED OMIT SUFFIX DESIGNATION X23 FROM CATALOG NO.

SPECIFICATIONS

Base Diam.	Catalog Numbers	Stem Data	Standard Finish	Standard Packing
7/8"	CG-290X23	8-32 Machine Screw With 3/8" Projection, Nut and Lock Washer	Nickel	Bulk
1 1/16"	CG-291X23			
1 1/4"	CG-292X23			
1 1/2"	CG-293X23			

FOR METAL TUBING WITH RUBBER EXPANDING ADAPTERS

The rubber expanding adapters are pliable enough to fit commercial variations of inside tubing diameters and are available in sizes to fit practically all of the popular sizes of tubing used on metal furniture. They provide a secure, simple, practical method of easy application. The tight fit of the rubber expander is an added noise and vibration reducer. They will not work loose under any normal operating conditions.

The adapter is expanded by turning the base of the glide by hand forcing the rubber adapter to bulge and fill the tubing, giving full length contact. The adapter can take all side shocks with no danger of bending or loosening.

Recommended for tables, stands, chairs and all metal furniture with tubular legs meeting the floor in a vertical position.

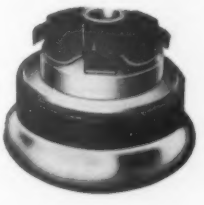


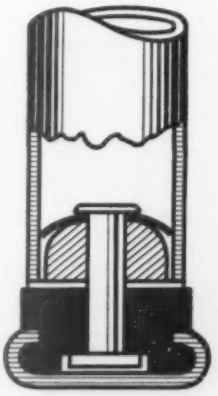


SPECIFICATIONS

Base Diam.	Catalog Numbers	For Outside Tubing Diameter		For Inside Tubing Diameter		Size Recommendation	Standard Finish	Weight Per Set	Standard Packing
		Nominal	Gauge	Nominal	Exact				
	CG-890 5/8"	5/8"	18	17/32"	.527"			3 oz.	
7/8"	CG-890 3/4"	3/4"	18	21/32"	.652"	Check Inside Diameter of Tubing to Determine Correct Glide for Application.	Nickel	3 oz.	Bulk
	CG-890 7/8"	7/8"	18	25/32"	.777"			3 oz.	
	CG-891 1"	1"	16	29/32"	.902"			4 oz.	
1 1/16"	CG-891 1 1/16"	1 1/16"	18	31/32"	.964"			4 oz.	
1 1/4"	CG-892 1 1/4"	1 1/4"	16	1 3/8"	1.120"			6 oz.	

"UMBRELLA" TYPE FOR METAL TUBING





These glides are specially designed for institutional and school use on metal chairs and cannot be removed except with tools. The umbrella-shaped steel spring retainer surmounts a dome shaped spacer bushing. Any attempt at removal, except with mechanic's tools, causes the umbrella-shaped retainer spring to bite deeper into the metal of the chair leg.

The design of Bassick rubber cushion glides prevents metal to metal contact between equipment leg and slide base thus eliminating noise and chatter when equipment is moved. SEE APPLICATION CUT-AWAY AT RIGHT.

SPECIFICATIONS

Base Diam.	Catalog Numbers	For Tubing		Standard Finish	Weight Per Set	Standard Packing
		Outside Diam.	Inside Diam.			
7/8"	CG-590 3/4"	3/4"	5/8"	Nickel	3 1/4 oz.	Bulk
*1 1/16"	CG-591 1" XLM	1"	.870"		5 1/2 oz.	

*This size supplied standard with leg mount.

Bassick "BASGO" RUBBER CUSHION GLIDES

NAIL TYPE FOR WOOD



Constructed with a heavier gauge flat steel base having a greater degree of hardness than competitive glides, providing longer life and easier sliding qualities. A live rubber cushion affords complete cushioning and maximum quietness. NO METAL TO METAL CONTACT BETWEEN BASE AND NAIL WHEN APPLIED.

Recommended for use on chairs, tables and other pieces of furniture where protection of floors, easy sliding and elimination of noise is desirable. Ideal for use on hard surface floors (tile, concrete, terazzo, wood, etc.) and all composition floor coverings.

The sharp nail drives easily. When being applied to small legs or in hard wood, a slight lead hole will facilitate the installation.

SPECIFICATIONS

Base Diam.	Catalog Numbers		Size recommendation — use the size with the largest diam. base the leg will accommodate, for greatest floor protection especially on linoleum, asphalt tile or other resilient floor coverings.	Unit Packing		Carton Packing	
	Nickel Finish	Stainless Steel		Sets Per Box	Weight Per Box	Boxed Sets	Gross Weight
7/8"	CG-90	CG-90SS		6	3/4 lb.	180	20 lbs.
1 1/16"	CG-91	CG-91SS		6	1 lb.	108	20 lbs.
1 1/4"	CG-92	—		6	1 lb.	72	15 lbs.
1 1/2"	CG-93	—		3	1/8 lb.	36	15 lbs.

SOCKET TYPE FOR WOOD



These glides are for use where chairs and other furniture have already been equipped with gripneck caster sockets. It is an easy matter to remove the caster and insert these quiet, easy sliding rubber cushion glides.

Constructed with a heavier gauge flat steel base having a greater degree of hardness than competitive glides, providing longer life and easier sliding qualities. A live rubber cushion affords complete cushioning and maximum quietness.

SPECIFICATIONS

Base Diam.	Catalog Numbers	Socket Data			Standard Finish	Unit Packing		Carton Packing	
		Bore Diam.	Bore Depth	Standard Socket		Sets Per Box	Weight Per Box	Boxed Sets	Gross Weight
1 1/4"	CG-392	3/8"	1 1/2"	No. 3 1" Track Plate	Nickel	1	7 oz.	25	12 lbs.
1 1/2"	CG-393	3/8"	1 1/2"			1	9 oz.	25	15 lbs.

MACHINE SCREW TYPE FOR METAL



SAME CONSTRUCTION AS NAIL TYPE SHOWN ABOVE EXCEPT WITH 8-32 MACHINE SCREW STEM PROJECTING 3/8" ABOVE RUBBER CUSHION

FURNISHED STANDARD WITH NUT AND LOCK WASHER. WHERE THESE ARE NOT REQUIRED OMIT SUFFIX DESIGNATION X23 FROM CATALOG NO.

SPECIFICATIONS

Base Diam.	Catalog Numbers	Stem Data	Standard Finish	Standard Packing
7/8"	CG-290X23	8-32 Machine Screw With 3/8" Projection, Nut and Lock Washer	Nickel	Bulk
1 1/16"	CG-291X23			
1 1/4"	CG-292X23			
1 1/2"	CG-293X23			

FOR METAL TUBING WITH RUBBER EXPANDING ADAPTERS

The rubber expanding adapters are pliable enough to fit commercial variations of inside tubing diameters and are available in sizes to fit practically all of the popular sizes of tubing used on metal furniture. They provide a secure, simple, practical method of easy application. The tight fit of the rubber expander is an added noise and vibration reducer. They will not work loose under any normal operating conditions.

The adapter is expanded by turning the base of the glide by hand forcing the rubber adapter to bulge and fill the tubing, giving full length contact. The adapter can take all side shocks with no danger of bending or loosening.

Recommended for tables, stands, chairs and all metal furniture with tubular legs meeting the floor in a vertical position.





SPECIFICATIONS

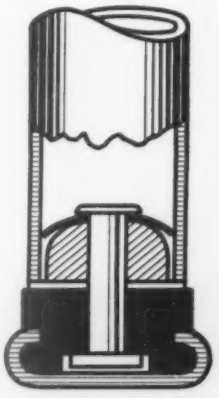
Base Diam.	Catalog Numbers	For Outside Tubing Diameter		For Inside Tubing Diameter		Size Recommendation	Standard Finish	Weight Per Set	Standard Packing
		Nominal	Gauge	Nominal	Exact				
7/8"	CG-890 5/8"	5/8"	18	17/32"	.527"	Check Inside Diameter of Tubing to Determine Correct Glide for Application.	Nickel	3 oz.	Bulk
	CG-890 3/4"	3/4"	18	21/32"	.652"			3 oz.	
	CG-890 7/8"	7/8"	18	25/32"	.777"			3 oz.	
1 1/16"	CG-891 1"	1"	16	29/32"	.902"			4 oz.	
	CG-891 1 1/16"	1 1/16"	18	31/32"	.964"			4 oz.	
1 1/4"	CG-892 1 1/4"	1 1/4"	16	1 1/8"	1.120"			6 oz.	

"UMBRELLA" TYPE FOR METAL TUBING



These glides are specially designed for institutional and school use on metal chairs and cannot be removed except with tools. The umbrella-shaped steel spring retainer surmounts a dome shaped spacer bushing. Any attempt at removal, except with mechanic's tools, causes the umbrella-shaped retainer spring to bite deeper into the metal of the chair leg.

The design of Bassick rubber cushion glides prevents metal to metal contact between equipment leg and slide base thus eliminating noise and chatter when equipment is moved. SEE APPLICATION CUT-AWAY AT RIGHT.



SPECIFICATIONS

Base Diam.	Catalog Numbers	For Tubing		Standard Finish	Weight Per Set	Standard Packing
		Outside Diam.	Inside Diam.			
7/8"	CG-590 3/4"	3/4"	5/8"	Nickel	3 1/4 oz.	Bulk
1 1/16"	CG-591 1" XLM	1"	.870"		5 1/2 oz.	

*This size supplied standard with leg mount.

BASSICK CASTERS

The Bassick Company is the largest manufacturer of casters in the world. The items listed on this page are representative types often used in schools. Complete catalog data and recommendations for any specific installation will be gladly furnished on request.

CASTERS FOR SCHOOL PIANOS

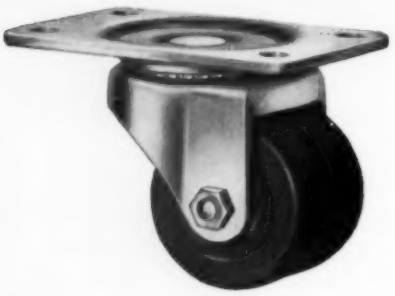
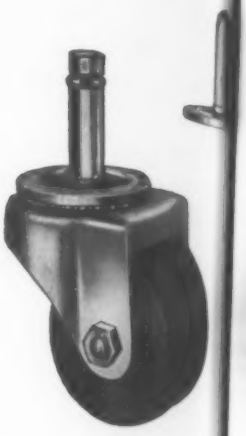


PLATE AND SOCKET TYPES—DOUBLE WHEEL

Low overall height, full floating ball bearing Diamond-Arrow casters specifically designed for easy movement of pianos in schools and protection to floors.



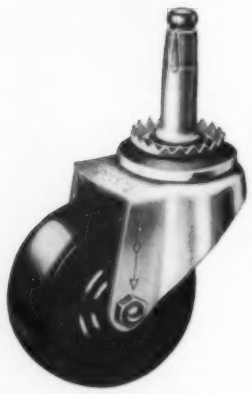
SPECIFICATIONS

Wheel Diam.	Tread Width	Overall Height Stem Caster	Overall Height Plate Caster	Size of Top Plate	Bolt Hole Spacing	Size of Bolt Holes
2"	1⅝"	2⅝"	2 13/16"	2¾ x 3¾"	1¾ x 3"	11/32"

CATALOG NUMBERS

Wheel Diam.	Catalog Numbers	Type Caster	Type Wheel	Weight Per Set-lbs.
2"	9006x2-66	Stem	Baco	3½
2"	9006	Plate	Baco	4

CASTERS FOR CHAIRS



DIAMOND-ARROW

The largest selling quality office chair caster — because of economy combined with top quality. The patented two level full floating ball race construction provides maximum ease of swiveling. Wheels have self-lubricating bearings.

The "Baco" soft rubber tread wheel is recommended for school use.

Catalog Numbers	Wheel Diam.	Tread Width	Overall Height	Bore for Socket	Weight Per Set
7696	1⅝"	¾"	2⅛"	⅜"	21 oz.
9696	2"	13/16"	2½"	⅜"	25 oz.

The casters listed are for wood chairs or furniture but can also be supplied with stems for all types of metal chairs.

CASTERS FOR DOLLIES AND TRUCKS



SERIES "68" "DIAMOND-ARROW"

The swivel truck casters listed below have the patented two level full-floating ball bearing construction which provides the utmost in easy action combined with economy. The numbers listed are supplied with the "Baco" soft rubber tread floor protecting wheels, self-lubricating bearings, and thread guards.

These are ideal for chair trucks and miscellaneous school service trucks. The Bassick Company manufactures various sizes and types of truck casters for every purpose. Complete catalog and information will be furnished on request.

SPECIFICATIONS

Wheel Diam.	Load Cap. Each	Catalog Numbers	Tread Width	Overall Height	Plate Size	Bolt Hole Spacing
2½"	80	2686-1	1⅛"	3 5/16"	2¾" x 3¾"	1¾" x 3"
3"	100	3686-1	1 5/16"	3 13/16"	2¾" x 3¾"	1¾" x 3"
4"	125	4686-1	1 5/16"	5 1/16"	3⅛" x 4⅛"	2⅜" x 3½"
5"	125	5686-1	1 5/16"	6 1/16"	3⅛" x 4⅛"	2⅜" x 3½"



Brunswick

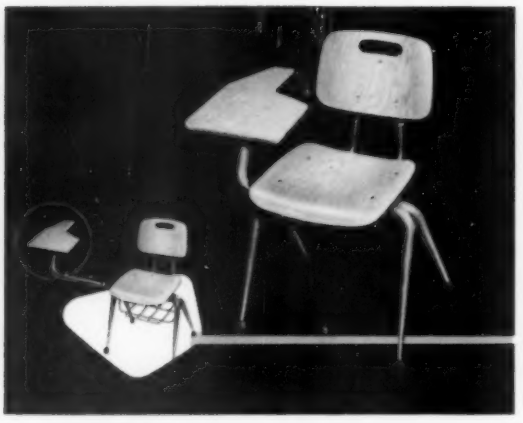
brings you a completely new line of school furniture with advanced design

rooms today are alive to a greater meaning. They ducation from a static, mechanical process and it a living, dynamic *experience*. Today's friendly rooms work toward the development of the whole ality of a child for he learns *best* when he learns his *whole being*. There is a homelike, livingroom phere that creates enthusiastic students . . . keeps high, bright and wide-open to learning. Today's om requires furniture that is durable, flexible and rtable to carry out these new functions.

Brunswick sets new standards in de



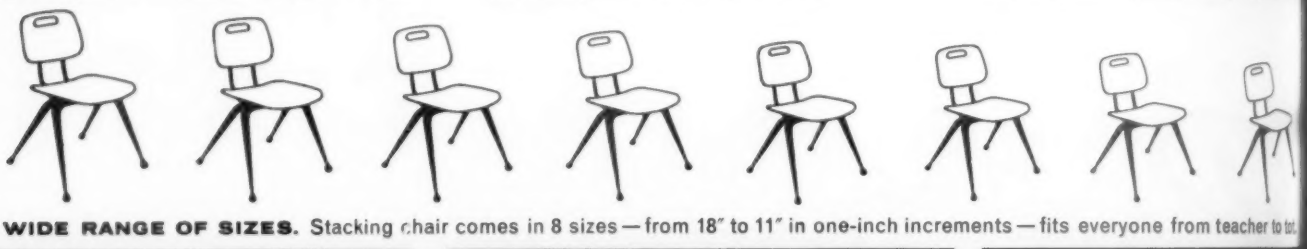
STACKING CHAIR. Body-contoured and comfortable, it stacks to create free area when you need it. Comes in red, green, yellow or natural Maple. 8 sizes.



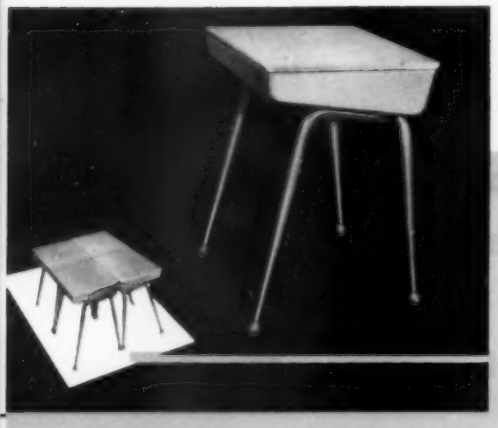
TABLET ARM CHAIR. Stacking chair with exclusive right or left-hand "write angle" tablet attachment in Maple or Maple-matched plastic. 16″, 17″, 18″ sizes.



CHAIR DESK. Stacking chair with [illegible] right-hand trapezoidal desk attachment [illegible] maximum writing area in Maple or [illegible] Maple-grained plastic. 16″, 17″, 18″ [illegible]



WIDE RANGE OF SIZES. Stacking chair comes in 8 sizes — from 18″ to 11″ in one-inch increments — fits everyone from teacher to tot.



BOOK BOX DESK. Groups into larger work areas. Plenty of storage space. Oversize no-slam lid in Maple or Maple-grained plastic top. 21″, 23″, 25″, 27″, 29″ sizes.



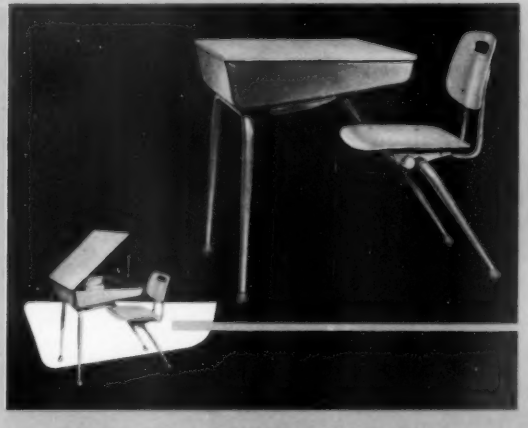
STACKING DESK. It groups, stacks . . . comes with permanent or removable book shelf. Oversize top in Maple or Maple-matched plastic. 21″, 23″, 25″, 27″, 29″ sizes.



TWO PUPIL STACKING DESK. [illegible] all the fine features of the stacking desk made double-wide to easily accommodate students. 21″, 23″, 25″, 27″, 29″ sizes.



STUDY TOP COMBINATION. New comfort, free leg area, clean lines. Optional book rack or book shelf. Choose Maple or Maple-grained plastic top. 27″, 29″ sizes.



BOOK BOX COMBINATION. Streamlined for comfort, new foot freedom. Spacious storage, no-slam lid. Maple or Maple-matched plastic top. 23″, 25″, 27″, 29″ sizes.



TEACHER'S DESK. One or two pedestals [illegible] according to top size. Desk has grey [illegible] panel, center drawer. Metal file unit [illegible] Three top sizes in Maple plywood or [illegible]

s in design, comfort and flexibility



CHAIR. Stacking chair with arm rest chment for relaxed comfort, smart arance. Available in red, green, yellow tural Maple. 16″, 17″, 18″ sizes.



FIBERGLASS CHAIR. Stacking chair in lightweight, durable fiberglass. Excellent in cafeterias, heavy traffic areas. Tangerine, beige and green. 17″, 18″ sizes.



ALL-PURPOSE CHAIR. Very comfortable, smart. 3 attachments possible—arm rests, tablet arm, desk arm. Maple or Walnut, black legs. Adult size only.

BRUNSWICK FEATURES

UNIFIED DESIGN. Advanced design characteristics, the same natural Maple wood, Maple-matched plastic and sage gray frame are carried through each unit Brunswick offers to give you a unified classroom . . . a unified school plant.

FLEXIBILITY OF USE. Only Brunswick brings you the stacking chair and the smart all-purpose chair both with 3 attachments to give you greater utility and greater economy. Brunswick units stack, group or nest wherever possible . . . offer a wide variety of optional features to fit any teaching situation.

COMFORTABLE SEATING. Built-in resiliency and body-contoured seats and backs give you real seating ease and long-lasting comfort.

FREE-STANDING FRAME CONSTRUCTION. All chair, desk and combination frames are welded into a single unit that's independent of seat, back, or top . . . independent of screws, bolts, or cross-bracing for structural support.

TOUGH WORKING SURFACES. All work surfaces—tables, desks, tablet and desk arm attachments—are available in Maple plywood or in durable Maple-grained plastic to match total Brunswick line.

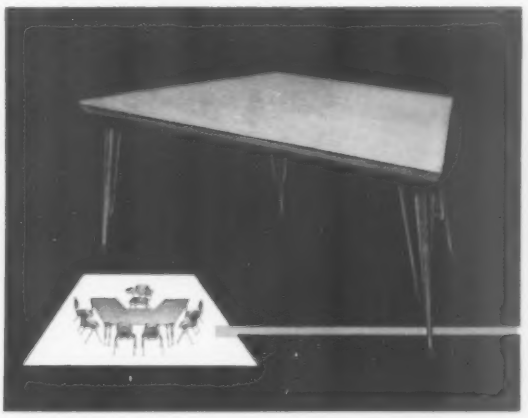
COLOR. The stacking chair and armchair come in red, green or yellow . . . the fiberglas stacking chair comes in tangerine, beige or green for colorful classrooms and cafeterias. The red knee panel of the teacher's desk matches the chairs.

RUNSWICK ADAP-TABLES

Pace-setters for interesting, flexible classrooms. Adap-tables provide for an endless variety of uses. These Brunswick tables are lightweight, built to withstand rugged wear, adapt to almost any teaching situation. Interchangeable leg heights makes any table easily convertible to any age group or activity. Comes topped with Maple-grained plastic. Book shelves are optional.



TANGULAR TABLE. An all-pur- ble. Groups and nests in 2″ heights. y braced legs. Maple or Maple- d plastic top in 5 sizes, 5 heights.



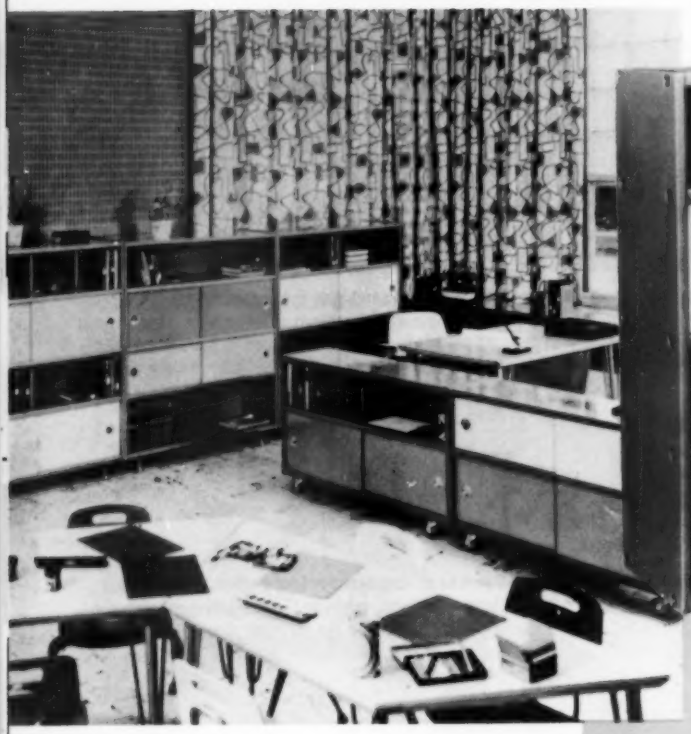
TRAPEZOIDAL TABLE. Shaped for interesting groupings. Stacks, nests in 2″ heights. Natural Maple or Maple-grained plastic top is 30″x30″x60″, 5 heights.



ROUND AND HALF-ROUND TABLES. 48″ diameter round tables are excellent for group activities. 24″ x 48″ half-rounds for corner work areas. Both in 5 heights.

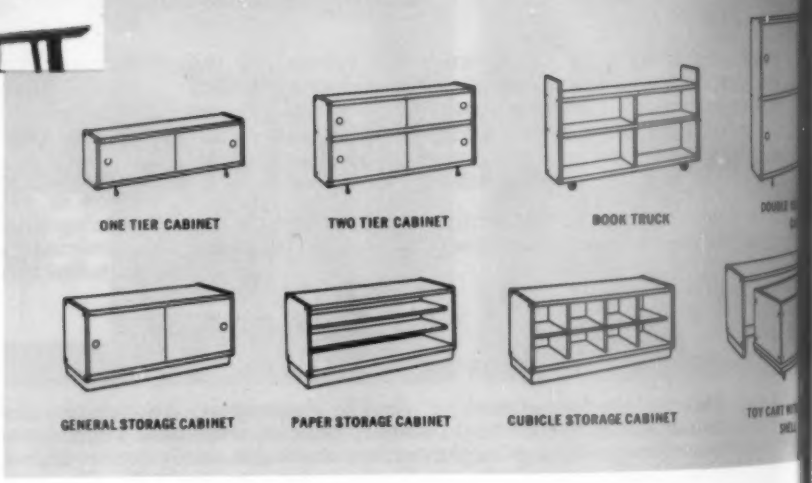
Brunswick

ADAPTABLE CABINETS BRING COLOR AND VERSATILITY TO THE CLASSROOM



The first and only cabin
to completely integrate
modern teaching metho





Brunswick's new cabinets give every classroom unprecedented flexibility while completely eliminating the need for custom-constructed storage units. They are designed with the dynamic nature of modern education in mind. They're VERSATILE—their mobility provides for countless room arrangements and classroom uses.

They're FLEXIBLE—standardized dimensions and interchangeable parts of the ten basic cabinets offer a simplicity in assembly with the widest variety of function. They're COLORFUL—the educator-selected coral, blue and yellow door colors bring a new drama and liveability to the classroom. See number $\frac{22d}{Br}$ in Sweet's File or write us for a cabinet catalog.

Consult the Brunswick representative nearest you.

Brunswick

THE BRUNSWICK-BALKE-COLLENDER CO.
623 South Wabash Avenue · Chicago 5, Illinois

D-3/Ed.

presenting...



Educators

1955-56 LINE OF

CLASSROOM CABINETS

Keyed to the modern concept of maximum flexibility in the classroom, Educators factory-built hardwood cabinets are increasingly favored by school administrators. Forty-one different units are provided to meet every classroom storage need. Construction permits easy transfer from one room to another . . . a major consideration with today's rapidly changing needs.

In addition to their primary function, Educators movable cabinets are real teaching aids. Caster-mounted units become work tables . . . serve as "space dividers" . . . make it simple to set up "activity areas".

Best of all, mass production offers the two basic advantages every school administrator wants, consistent quality and low cost!

Educators
PLANNING SERVICE

When planning a new school or school addition, the architect or administrator will find it helpful to call in an Educators representative. His counsel during the planning stage can be of great assistance in the most effective use of Educators Cabinets.

Educators **MANUFACTURING CO.**

Main Office: 721 East 25th Street, Tacoma, Washington

DEALERS THROUGHOUT THE UNITED STATES

A FILE NO. 35-8-4

Educators

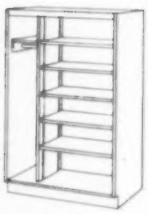
"100 SERIES"

TEACHERS STORAGE CABINETS

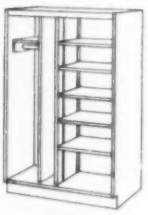
Compact and complete, these cabinets provide the teacher with specific facilities for coat and hat storage, play ground equipment, folder filing, and miscellaneous bulky objects. Suspension file drawers equipped with ball-bearing slides. Shelving is adjustable. Locks are optional on all units.



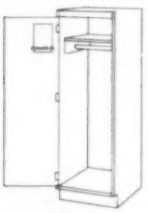
No. 101
23½" x 47½" x 71½"
(Doors Not Shown)



No. 102
23½" x 47½" x 71½"
(Doors Not Shown)



No. 103
23½" x 47½" x 71½"
(Doors Not Shown)



No. 104
23½" x 24½" x 71½"

Educators

"200 SERIES"

STUDENT WARDROBES



No. 205
23½" x 120" x 71½"
36 hangers included

These units provide attractive, space-saving storage for the dents' outer clothing. The unit illustrated above features Mod ern-fold doors. Other cabinet units are available with or with out doors. Hangers are permanently attached to the poles, and are available in 12", 14", and 16" sizes. Cubicle and pole units in Nos. 201-2 and 203-4 are adjustable for height.



No. 201
Without Doors
No. 202 With Doors
23½" x 47½" x 71½"
18 hangers included



No. 203
Without Doors
No. 204 With Doors
23½" x 47½" x 71½"
18 hangers included



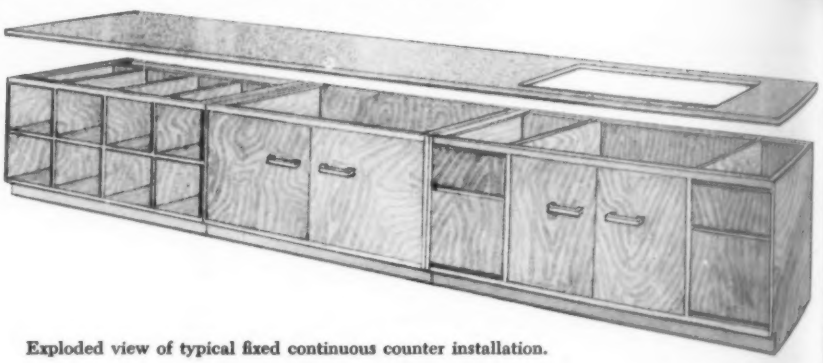
No. 206
12" x 60" x 14½"
18 hangers included

Educators

"500 SERIES"

FIXED COUNTER CABINETS

Five basic units are available for fixed counter-height installation, offering a wide variety of adaptations for classroom storage. Each unit is available with individual Formica top, or Formica tops are available in any length for continuous fixed counter installation with back and end splash rails as specified.



Exploded view of typical fixed continuous counter installation.



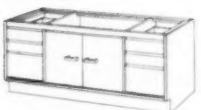
No. 501 Without Doors
No. 502 With Hinged Doors
No. 503 With Sliding Doors
23½" x 47½"
Heights: 25 3/16"
29 3/16" – 33 3/16"
35 3/16" (Base Only)



No. 504
23½" x 47½"
Heights: 25 3/16"
29 3/16" – 33 3/16
35 3/16" (Base Only)



No. 505 Without Doors
No. 506 With Hinged Doors
23½" x 47½"
Heights: 25 3/16"
29 3/16" – 33 3/16"
(Base Only)



No. 507
23½" x 71½"
Heights: 25 3/16" (2 drawers each side)
29 3/16" – 33 3/16"
35 3/16" (3 drawers each side)



No. 508
Top 24" x 72"
Complete with Sink
Heights: 26" (2 drawers each side)
30" – 34" – 36"
(3 drawers each side)

Educators

"300 SERIES"

CLASSROOM SUPPLY CABINETS

These units provide varied facilities to store all types of instructional supplies. All are equipped with adjustable glides to compensate for uneven floors, activated by a simple Allen wrench adjustment from within the cabinet. Shelves are adjustable. No. 302 features butcher paper dispenser and tilted shelves to accommodate construction paper. Nos. 301, 302, and 303 each have full length drawer and four half-length drawers.



No. 301
23½" x 47½" x 71½"
Doors Not Shown



No. 302
23½" x 47½" x 71½"
Doors Not Shown



No. 303
23½" x 47½" x 71½"
Sliding Glass Doors



No. 304
23½" x 47½" x 71½"

Educators

D-3/Ed.

"400 SERIES"

MOVABLE COUNTER CABINETS

Primarily designed for general storage, Educators movable counter cabinets also serve as space dividers and convenient work surfaces. Tops are available in colorful Formica, providing an ideal surface for clay modeling, paste pot work, etc. All units are equipped with double-wheel piano type casters.



No. 409
Top 28" x 42"
24" x 36" Paper Storage
Heights: 26" – 30" (4 drawers)
34" – 36" (5 drawers)



No. 401 Without Doors
No. 402 With Hinged Doors
No. 403 With Sliding Doors
Top 24" x 48"
Heights:
26"–30"–34"–36"
Planter Pan Optional



No. 404
Top 24" x 48"
Heights:
26"–30"–34"–36"



No. 405 Without Doors
No. 406 With Hinged Doors
Top 24" x 48"
Heights: 26"–30"–34"



No. 407 Without Doors
Top 24" x 48"
Heights:
26"–30"–34"–36"



No. 408
Top 24" x 48"
Heights: 26"–30" Only

Educators

"600 SERIES"

SPECIAL PURPOSE UNITS



No. 601 BOOKMOBILE
Cork or chalkboard optional on reverse side. Magazine rack and seven shelves (28 lineal feet). Double wheel piano casters.
24" x 48" x 50½"



No. 604 CLAY CART
Enameled metal pan for wet clay, enameled metal drawer for dry clay. Removable Formica "bread-board" type cover. On casters.
19⅜" x 19⅜"



No. 602 WORK BENCH
Laminated top. Wood vise and metal working vise. Partitioned tool and project storage. Retractable casters on 28" and 32" sizes.
Top: 2¼" x 30" x 48"
Heights: 24" – 28" – 32"



No. 605 BLOCK CART
19⅜" x 19⅜"

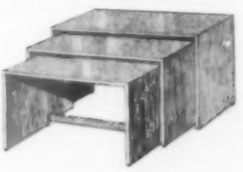


No. 606 BLOCK CART
19⅜" x 38¾"

Nos. 604 – 605 – 606 available in 22½" heights for use under 26" high No. 408 and 26" high continuous counter.
Nos. 604 – 605 – 606 available in 23¾" heights for use under 30" high No. 408 and 30" continuous counter.
Use Nos. 607 – 608 – 609 for 26" high No. 408 and 26" high continuous counter.
Use Nos. 607 – 608 – 609 – 610 for 30" high No. 408 and 30" high continuous counter.



No. 603 BOOK SHELF
Fits under windows or ideal for space division and library areas. Formica top. Center shelf fully adjustable. Bassick slides.
Top: 11¾" x 48"
Height: 30" only.



NESTING TABLES
(Formica Top)
No. 609
19" x 35" x 22½"
No. 608
19" x 32" x 21"
No. 607
19" x 29" x 19½"
No. 610
19" x 38" x 24"
(Not Shown)

CONDENSED GENERAL SPECIFICATIONS

MATERIALS:

End panels, case bottoms, six foot case tops, partitions over 36" in length and all adjustable shelves shall be 13/16" birch plywood with hardwood face strip. All posts, aprons, drawer fronts, sides and backs and all structural parts shall be solid hardwood. All tops for counter units shall be overlaid with genuine Formica and banded with anodized aluminum T-mould.

HARDWARE:

Door and drawer pulls shall be solid brass and hinges for 6' cabinets shall be wrap-around type, 2½" x 3⅝", finished to match. Other hardware shall be according to detailed specifications.

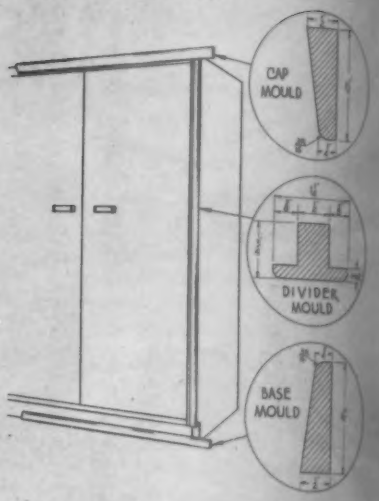
FINISH:

All cabinets shall be finished at the factory with no painter's finish required after installation. Surfaces shall be smoothly sanded and finished with one coat of bonding agent, one coat of 21% solids sealer and two coats of 21%-24% solids semi-gloss lacquer.

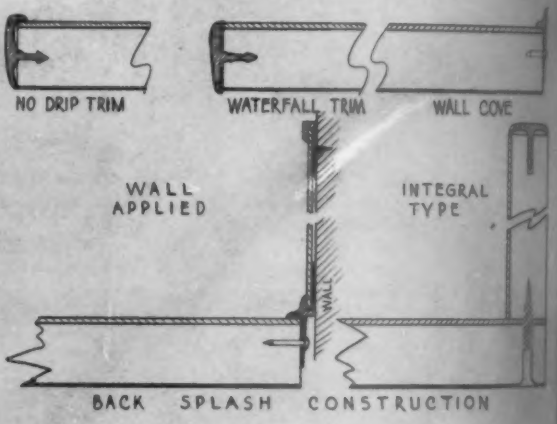
INSTALLATION:

Six foot cases shall be levelled and fastened securely to the wall or to the floor. When specified cabinets shall be trimmed in with matching hardwood moulding. Workmanship shall be first class throughout.

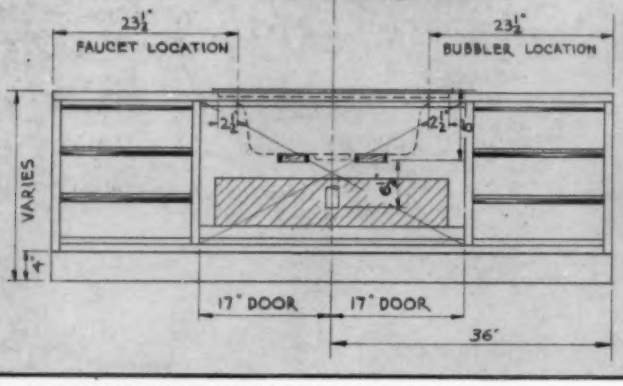
CABINET JOINERY



METAL TRIM MOULDINGS



SINK ROUGH-IN MEASUREMENTS



RECOMMENDED HEIGHTS FOR COUNTER CABINETS				
GRADE	K - 1	2 - 4	5 - 7	8 - 12
HEIGHTS	26"	30"	34"	36"

A FEW TYPICAL INSTALLATIONS:

ALASKA:
- Ladd Air Force Base Elementary School (Fairbanks)

ARIZONA:
- Window Rock School (Window Rock)
- Riverside School (Phoenix)
- Emerson School (Mesa)

CALIFORNIA:
- Martinez and John Muir Elementary Schools (Martinez)
- Sunnybrae Elementary School (Arcata)
- Freshwater Elementary School (Freshwater)
- San Miguel Elementary School (Lemon Grove)
- Fruitvale Elementary School (Rio Linda)
- Fallbrook Elementary School (Fallbrook)
- Oleander Elementary School (Fontana)
- East Whittier Intermediate School (Whittier)

ILLINOIS:
- Bensenville Elementary School (Bensenville)
- Highcrest, Howard, and Harper Schools (Wilmette)
- Komarek School (North Riverside)

MICHIGAN:
- John Hill School (Inkster)
- Farmington Public School (Farmington)
- North Hill School (Rochester)
- Longfellow School (Royal Oak)

OREGON:
- Fir Grove Elementary School (Beaverton)

WASHINGTON:
- Gregory Heights and Bow Lake Schools (Highline School Dist., Seattle)
- Lakeview School (Moses Lake)
- Everett School (Lake Stevens)
- View Ridge and Whittier Elementary Schools (Everett)
- Christ the King Parish School (Richland)

WISCONSIN:
- Tibbits Grade School (Elkhorn)

Educators

MANUFACTURING CO.

721 E. 25TH STREET, TACOMA, WASHINGTON

DISTRIBUTORS:

Educators Furniture & Supply Co., Inc.
5912 R St., Sacramento, Calif.

Educators Furniture & Supply Co., Inc.
5800 E. 2nd St., Long Beach, Calif.

Educators Furniture & Supply Co., Inc.
557 Roy St., Seattle, Wash.

American Paper & Supply Co.
444 South Second West St.
Salt Lake City 4, Utah

American Seating Co.
2930 Canton St., Dallas, Texas

The Backus Bros. Co.
225 E. Third St., Cincinnati, Ohio

W. W. Bailey Co.
2123 Third Ave., Rock Island, Illinois

Chas. H. Bunch Co.
337 West Main St., Louisville, Kentucky

Colborn School Supply Co.
Grand Forks, North Dakota

Herbert L. Farkas Co.
892 Broad St., Newark 2, New Jersey

Garrett-Buchanan Co.
12-26 So. 6th St., Philadelphia, Penn.

F. F. Hansell & Bro. Ltd.
131 Carondelet St., New Orleans, La.

Highland Products Co.
720 So. Gay St., Knoxville, Tennessee

L. W. Holley and Sons
100 East Grand Ave., Des Moines 7, Iowa

Hunt's Supply Co.
Wautoma, Wisconsin

Kistler Stationery Co.
1636 Champa St., Denver, Colorado

Mississippi School Supply Co.
116 E. South St., Jackson, Mississippi

Nashville Products Co.
158 Second Ave. No.
Nashville 3, Tennessee

Oglesby Equipment Co.
20356 Grand River Ave.
Detroit 19, Michigan

Oklahoma Seating Co.
19 W. Main St., Oklahoma City 2, Okla.

Omaha School Supply
1113 Nicholas St., Omaha, Nebraska

PBSW Supply and Equipment Co.
530 W. Washington St., Phoenix, Arizona

Sarrett Office Equipment Co.
427 Fremont St., Las Vegas, Nevada

School Equipment Co.
Box 586, Siler City, North Carolina

School Products Co.
357 Madison Ave., Memphis, Tennessee

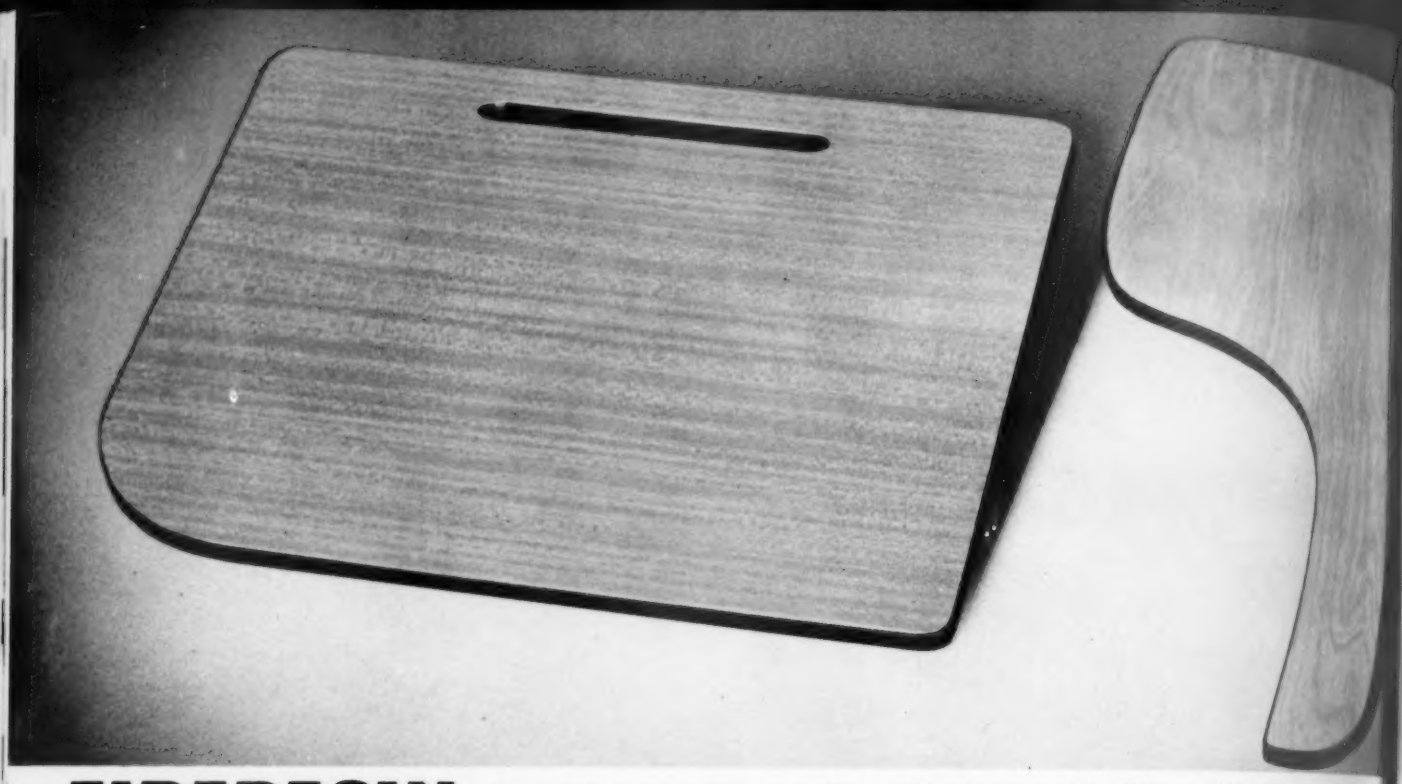
Sioux Falls Book & Stationery Co.
Sioux Falls, South Dakota

D-3/FI

of course it's FIBERESIN



TOP QUALITY
solid plastic tops



FIBERESIN *A New Era in School Desk Tops!*



The merits of FIBERESIN have led to widespread adoption by leading school desk manufacturers. FIBERESIN installations now spread from Nova Scotia to Guam, and from Nome to Caracas. In addition to all of the usual and varied resistance of today's laminated decorative plastic materials, FIBERESIN achieves an additional resistance of vital importance in the school field — resistance to students. Resistance to gouging, nicking, prying, trenching, or doodling.

The explanation is as simple as the record is outstanding, and is due to the materials and techniques used in our exclusive manufacturing process. Under the FIBERESIN process, the usual melamine plastic and phenolic plastic materials are molded and bonded in one operation to both sides of a special fibre-phenolic core material under heat and pressure.

The various materials flow together to interlink and form one solid homogenous board; unmarred by separate glue lines or backing sheets, and affording the additional advantages of an edge which will withstand abuse. This edge may be shaped, stained and lacquered and this provides an enhanced appearance without the usual costly, fragile metal or plastic molding.



RESISTANT . . . Pupils can doodle to their hearts' content with crayon, ink, chalk, and even with the ordinarily destructive ball point pen. There are no veneer layers, metal edges or wood edge mouldings for probing jackknives and pencil points to pry apart. There is no warping — no give

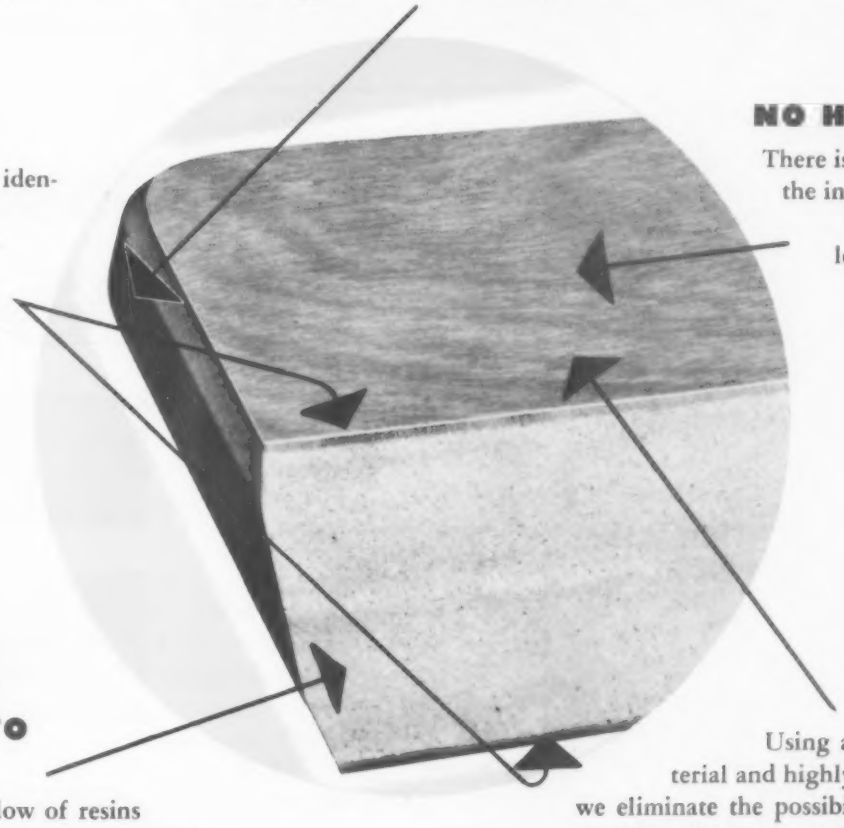
FIBERESIN IS UNIQUE . . .

SANITARY EDGES

The edges of FIBERESIN board may be treated by any method acceptable to end grain hardwood. They may be sawed, shaped, grooved, routed, sanded, stained, lacquered, painted or varnished. Because of the hard dense core material used, they will withstand severe impact shocks, and when accidentally damaged by conditions of extreme abuse, may be refinished on the desk. It is not necessary to remove a unit from service and return it to the manufacturer. Elimination of edge concealment by banding also eliminates a sanitary hazard, in that there is no crevice to trap and hold food, milk, dirt, germs or other sources of contamination. Dairy and Health inspectors are becoming more insistent upon seamless construction and FIBERESIN offers the answer with better appearance and sanitary construction at lower cost.

IDENTICAL SURFACES

The use of physically identical top and bottom surfaces insures a virtually warp-free board and forms an impenetrable barrier against moisture absorption.



NO HIGH SPOTS

There is no possibility for the introduction of glue line irregularities leading to the creation of rapidly wearing "high-spots" in the board.

"ONE PIECE" FROM FACE TO FACE

Because of the interflow of resins under great heat and pressure, we achieve a one piece top with a plastic bond from face to face; thus eliminating the danger of delamination or glue line separation.

A PERFECT SURFACE

Using a grain free core material and highly finished press plates we eliminate the possibility of surface irregularities, the "telegraphing" of grain patterns or other core irregularities. No ripples or shadows mar the appearance of FIBERESIN board stock.

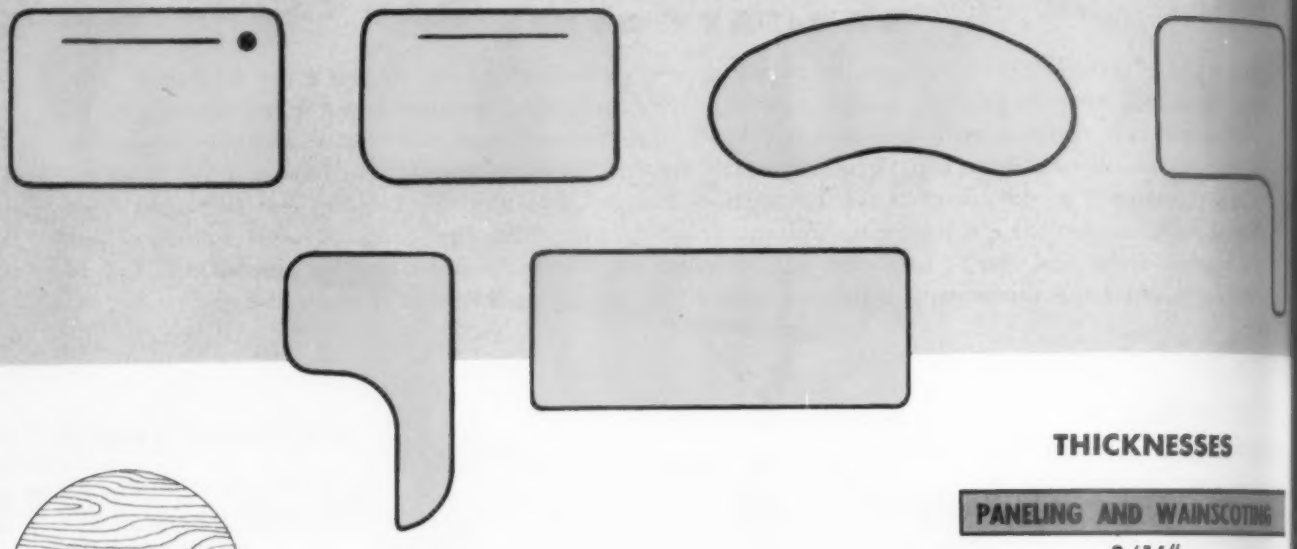


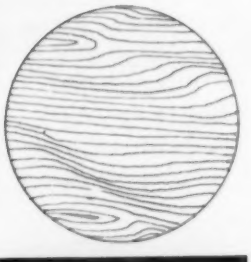
REFLECTIVE . . . FIBERESIN'S scientifically developed surface scored an A + in reflectance tests conducted by the University of Wisconsin Electrical Standard Laboratory, showing an ideal reflectance surface value of 40 to 50 per cent. Restful natural wood grain color tones provide easy-on-the-eyes writing and reading surfaces.



REMARKABLE . . . A damp cloth and very little elbow grease are the only upkeep costs of FIBERESIN Desk Tops. Marks and stains are readily removed by wiping. Dirt and germs have no place to embed themselves on the non-porous surface. The plastic resins provide an antiseptically clean surface. FIBERESIN tops never need refinishing.

FIBERESIN IS ADAPTABLE

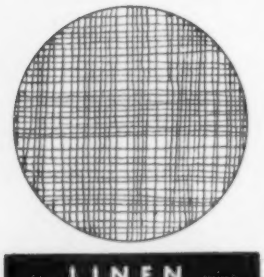




WOOD GRAINS



ASST'D PATTERN STYLES



LINEN TEXTURE

IN A WIDE VARIETY OF PATTERNS AND COLORS

Natural wood finishes, or linen, in soft or bright colors, in light or dark tones. Assorted pattern styles, including Sierra pattern pictured, available upon request. Tan Birch pattern is recommended for school use.

WIDELY AVAILABLE through established school equipment distributors. We will be pleased to send you the name of the distributor in your area.

WIDELY AVAILABLE on the best new school equipment, library tables, cafeteria tables, and home, business, and institutional furniture, in any desired edge shape. Modern design demands a modern top . . . insist upon FIBERESIN. Foremost manufacturers of high quality furniture feature FIBERESIN.

THICKNESSES

PANELING AND WAINSCOTING
3/16"

PANELING AND FURNITURE
5/16"

FURNITURE AND SCHOOL DESKS
5/8"

FURNITURE AND SCHOOL DESKS
13/16"

SCHOOL EDGE

RESTAURANT EDGE

SOFT-ROLLED EDGE

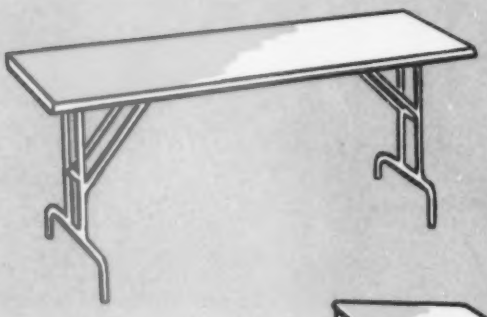
In any size and shape up to 48" x 96"

FIBERESIN IS APPROVED

the logical choice of leading manufacturers



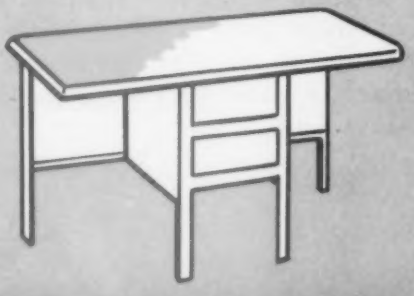












Many leading furniture manufacturers in the U. S. and Canada approve FIBERESIN as the one material for beauty *and* durability . . . and are using it where these two important features must be combined in furniture.

The wide choice of surfaces and finishes available make FIBERESIN especially suitable. Designs and styles of furniture can be produced with the assurance they will harmonize with other decorating schemes.

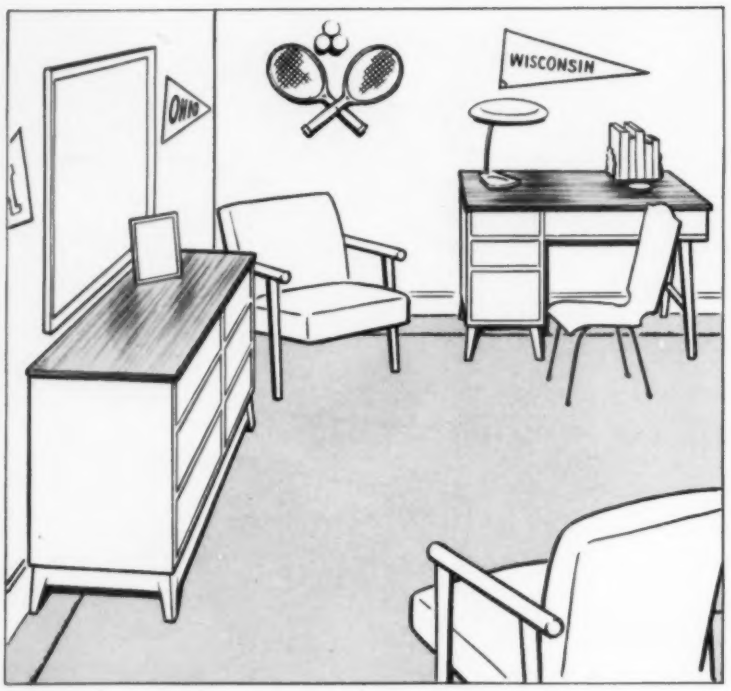
FIBERESIN is also available in a wide range of thicknesses (3/16", 5/16", 5/8", 13/16") making FIBERESIN ideal for all phases of furniture construction. The 3/16" stock is perfect for wall paneling and wainscoting, 5/16" for furniture paneling and television and radio cabinets, 5/8" for furniture and desk tops, and 13/16" for large pieces where a massive appearance is necessary or desired.

Actually, in many instances, FIBERESIN tops have added the touch of beauty and durability which mean extra quality and greater sales in furniture.

FIBERESIN, being available not only pre-cut, but also in large sheets, means little waste in fabrication. FIBERESIN'S easy workability, solid edges, and various thicknesses also save on manufacturing time.

Plan *today* with *tomorrow* in mind! Specify FIBERESIN, best in every way.

FIBERESIN IS BEAUTIFUL

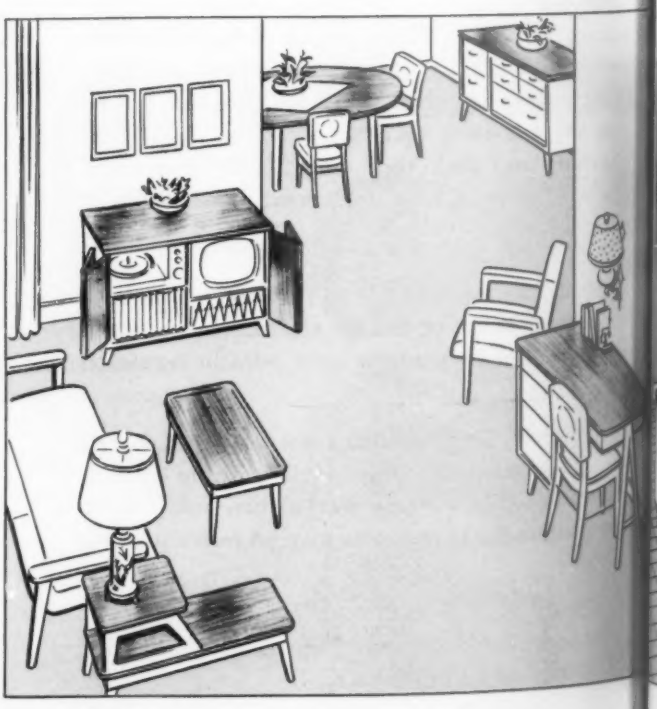


FOR INSTITUTIONAL FURNITURE

Wherever furniture is exposed to the rough treatment of public or semi-public use, FIBERESIN is providing the indestructible surface. FIBERESIN Plastic Tops are in daily use in hospitals, institutions, sanatoriums, restaurants, taverns, hotels, motels, college dormitories, and steamships. FIBERESIN Plastic Tops combine decorator beauty with real durability plus sanitary solid edges and a surface that is impervious to heat, water, alcohol, cigarette burns, acids, and grease... all-important features for these applications. Maintenance is at a minimum, too. A FIBERESIN Plastic Top never needs refinishing, cannot warp or rot, and is easily cleaned with a damp cloth.

FOR THE HOME

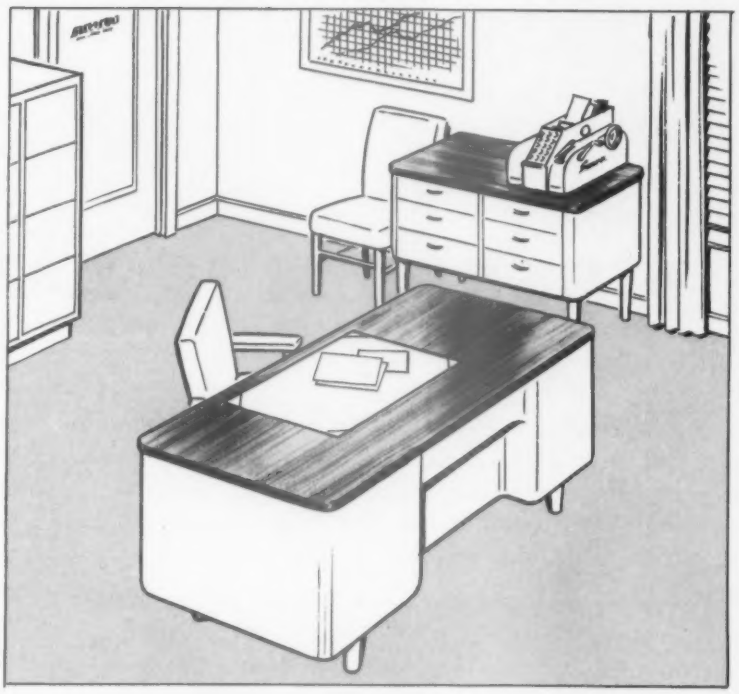
FIBERESIN is at home throughout the home. Its lasting beauty, various colors and patterns, and solid, trim-free edges make FIBERESIN a "natural" for every room in the home. It lends itself perfectly to living room occasional tables, cocktail tables, television and radio cabinets, and wall paneling. The dining room table and buffet are more practical in FIBERESIN. Kitchen counters and work spaces, bedroom furniture, and shower bath paneling are all more beautiful, more durable, and more practical when produced with FIBERESIN. FIBERESIN cannot be nicked or scratched, cannot be "ringed" by carelessly placed drinks or hot utensils, cannot be burned by forgotten cigarettes, is not harmed by water, can't warp, and never loses its finish.

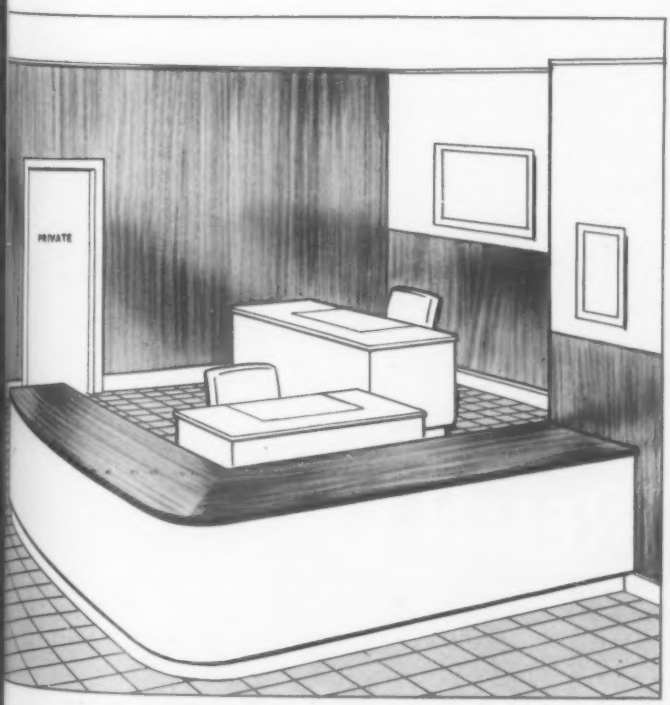


FIBERESIN IS DURABLE

IN BUSINESS

Here, again, FIBERESIN Plastic Tops are ideal. For office desks, tables, and business machine work tops, FIBERESIN provides the indestructible surface and correct light reflectance, plus beauty and clean lines to enhance the modern, functional office. Store fixtures and check-out counters are another ideal application for FIBERESIN because of its extremely high resistance to surface abrasion. Its durability and smooth, hard surface are also important and desirable in laboratories, for X-ray tables, and thousands of other specialty items where durability, beauty, and practicality must be combined.





AND IN CONSTRUCTION

Beautiful FIBERESIN wall paneling and wainscoting has found its place in America's modern homes and offices. A room paneled in one of the many pleasing FIBERESIN patterns is truly beautiful as well as practical. FIBERESIN resists fire and cannot be harmed by children or by carelessly placed chairs or other furniture. Color and grain matching is no problem and FIBERESIN paneling cannot warp or lose its surface finish, which, by the way, is a soft satin effect. FIBERESIN paneling is ideally suited to bathrooms and showerbaths, kitchens, institutions, corridors, busses, trains, airplanes, and steamships.

FIBERESIN HAS BEEN PROVED

FIBERESIN meets or exceeds all requirements of NEMA specification LP-2 covering melamine decorative plastic surfaces.

FIBERESIN has particular resistance to abrasive surface wear, high temperatures including burning cigarettes, surface impact, moisture pickup, warping, and dimensional change.

The FIBERESIN surface is twice as hard as maple and absolutely free of glueing ripples, grain telegraph, and other surface distortions.

FIBERESIN IS EASILY WORKED

As with all new materials, new methods and modified techniques are essential to achieve the best possible fabrication results. In general, ordinary production woodworking machines can be used for all machining steps.

For circular sawing, a Carbide tipped 12" 60 tooth blade at a speed of 3600 to 4200 r.p.m. is recommended and for bandsawing, a 4 to 6 toothed "Skip-toothed" blade at 5000 r.p.m. will give best results. Edge shaping can be achieved with a vertical spindle shaper with Carbide tipped blades operating at 8000 to 10,000 r.p.m. for two blade and 6000 to 8000 r.p.m. for three blade. Edge sanding can be done with a pneumatic drum sander. The FIBERESIN material will not clog a sanding drum.

FIBERESIN should be pre-drilled for attaching screws. The material is so hard and dense that it has none of the compressibility or flexibility of wood, thus holes must be accurately located and pre-drilled. This procedure provides maximum screw holding power and enduring rigidity. No. 10 sheet metal screws are recommended and predrilled holes drilled with a 9/64" diameter drill, must be deep enough to prevent screws "bottoming".

One of the outstanding features of FIBERESIN material is its ability to take almost any type of edge finish desired. It may be stained, shellacked, sealed, varnished, filled, waxed, lacquered, painted, or banded. Any excess material which adheres to either the top or bottom surfaces may be removed with suitable thinners without leaving a trace. Stain finishes will blend with the core stock to match the various patterns, and it is suggested that such finishes be protected with a coat of clear varnish or lacquer for maximum eye appeal. Virtually any finishing method may be used, and the edge finish bonds with the core material to form a long lasting, permanent finish. In most instances, it is advisable to apply two or three coats of the desired material, sanding between coats to achieve a hard, smooth, impervious edge.

PIONEERED AND DEVELOPED BY

FIBERESIN®

PLASTICS COMPANY

FIBERESIN PLASTICS COMPANY • OCONOMOWOC, WI

...round of this page is a reproduction of the distinctive Textolite school DESQUE pattern—Sage Green

D-3/G-E

All through your school...

cut maintenance problems to a minimum!

Textolite®

plastic surfacing
for counters and walls



IN CLASSROOMS



IN HOME ECONOMICS ROOMS



IN CAFETERIAS



IN DORMITORIES

Textolite®... for years of wea

plastic surfacing

It's so easy to save on maintenance costs when you specify General Electric Textolite plastic surfacing in *your* school. G-E Textolite is so wonderfully versatile and so durable it never requires painting or refinishing . . . colors won't fade, and it lasts for years!

It's so easy to care for G-E Textolite plastic surfacing. Textolite resists stains, heat and scratches . . . it ignores spilled inks, hard knocks—even ordinary household chemicals! Just a wipe with a damp cloth keeps the beautiful Textolite surface clean and sparkling.





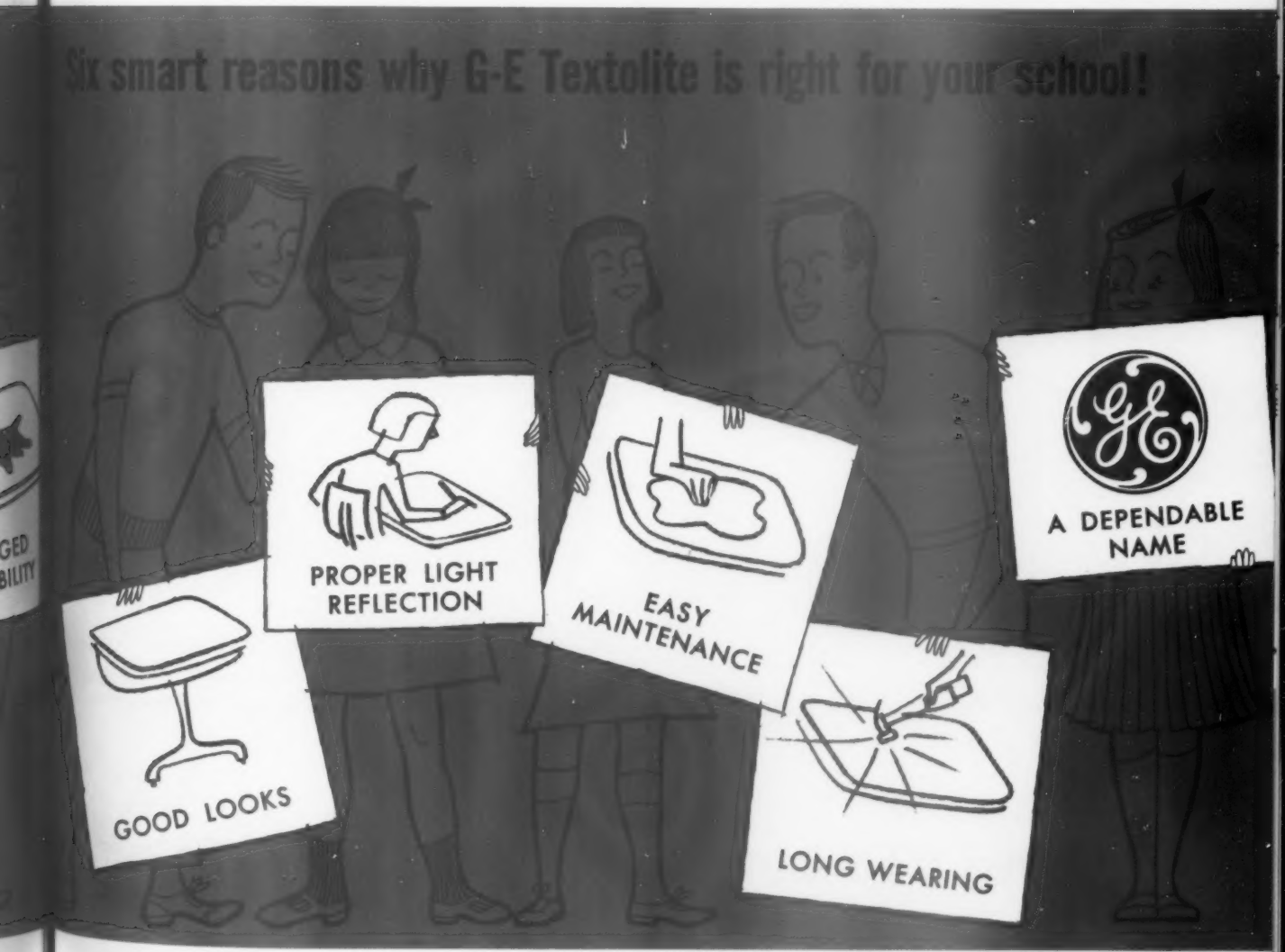
D-3/G-E

...with minutes of care

It's so easy to keep eyestrain to a minimum with G-E Textolite Desque patterns. Based on light-reflectance tests made by General Electric lighting engineers, this specially designed school-desk pattern minimizes glare and reflection... is recommended for desk tops.

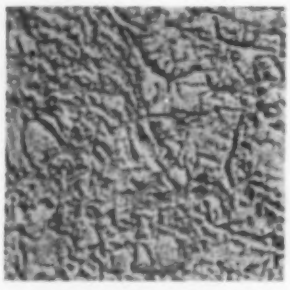
It's so easy to be proud of G-E Textolite surfacing in your school. In addition to its good looks and great utility, the General Electric name stands behind this product . . . an indication that you have set the highest standards for the equipment in your school.

Six smart reasons why G-E Textolite is right for your school!

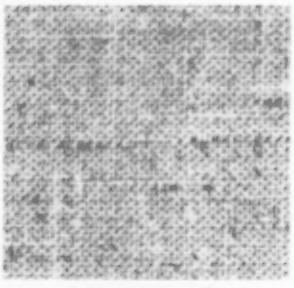


Over 70 Textolite® patterns and colors!

G-E Textolite plastic surfacing comes in the widest variety of distinctive patterns and breath-taking colors imaginable. Shown below are just a few of the beautiful Textolite designs.



G-E DESQUE PATTERN
Available in Tan, Grey, and Green (as shown on the cover of this booklet) scientifically right for all desk tops.



G-E LINEN PATTERN
A beautiful design with the look of real linen—perfect for home economics rooms, cafeterias and dormitories. Comes in Blue, Tan, Green, Grey, Red, and Yellow.



G-E BIRCH PATTERN
One of 12 authentic-looking wood grains—a smart choice for classrooms and dormitories.

For more information and actual samples of G-E Textolite surfacing, call your nearest G-E Textolite Distributor (he's listed under "plastics" in your classified directory) OR WRITE: GENERAL ELECTRIC COMPANY, DEPT. ASU5-5, P.O. BOX 5911, CLEVELAND 1, OHIO.

GENERAL ELECTRIC—REGIONAL SALES OFFICES

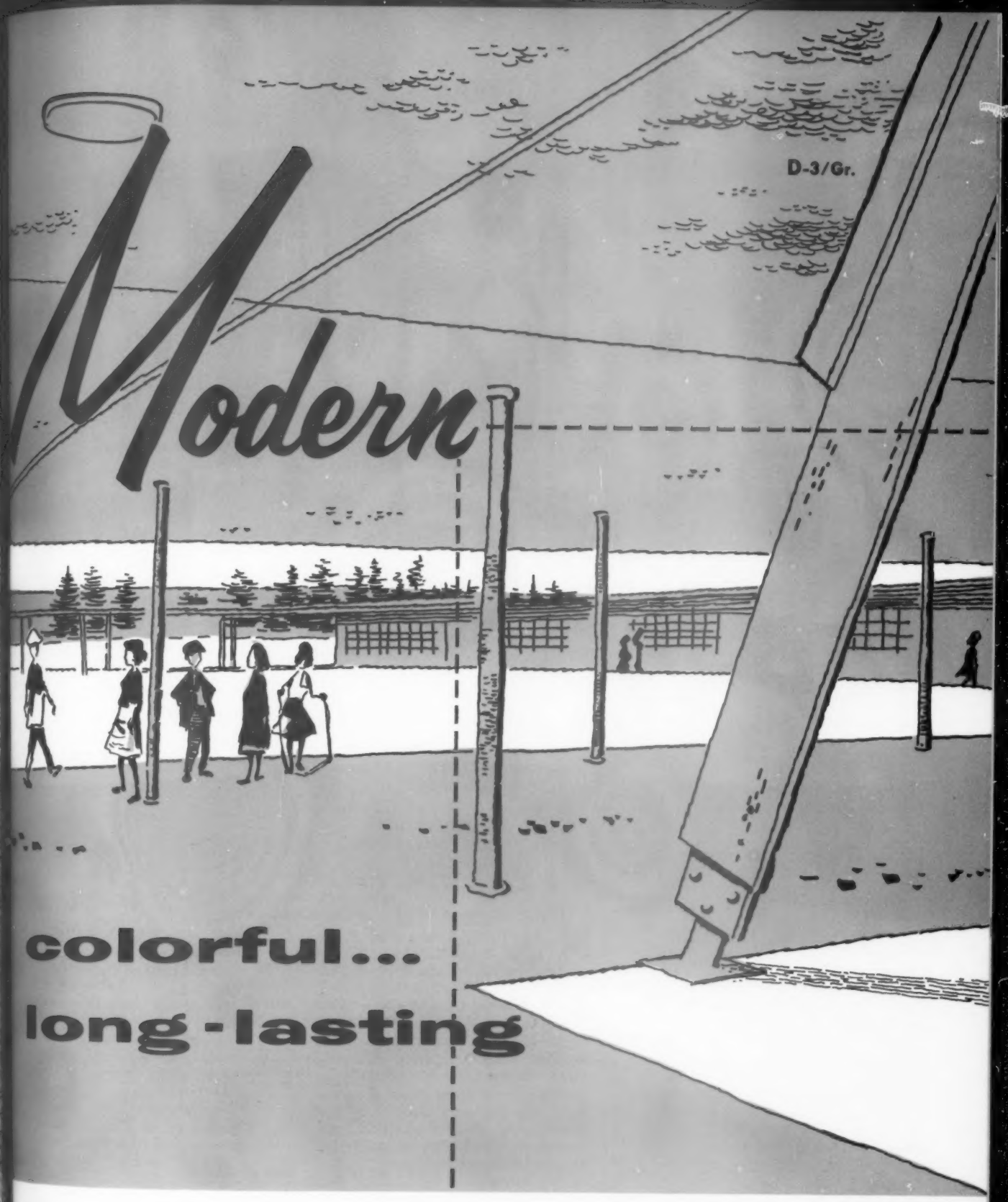
California: 1052 W. Sixth St., Los Angeles 17; 235 Montgomery St., San Francisco • **Georgia:** 187 Spring St., Atlanta • **Illinois:** 840 So. Canal St., Chicago 80 • **Massachusetts:** 140 Federal St., Boston 1 • **Michigan:** 2211 Woodward Ave., Detroit 1 • **Minnesota:** 2524 Hennepin Ave., Minneapolis • **Missouri:** 2619 McGee Trafficway, Kansas City 8 • **New York:** 570 Lexington Avenue, New York 22 • **Ohio:** 1105 Chester Ave., Cleveland 14; Laminated and Insulating Products Department, Coshocton • **Pennsylvania:** 1405 Locust St., Philadelphia 2 • **Texas:** 6617 Snider Plaza, Dallas 5 • **Washington, D. C.:** 777 14th St., N. W.

AUTHORIZED G-E TEXTOLITE DISTRIBUTORS

Alabama: Birmingham Sash & Door Co., 901 N. 28th St., Birmingham • **California:** W. S. Dixon Co., 931 E. 31st St., Los Angeles; Roddiscraft, Inc., 2620 E. Vernon Ave., Los Angeles; Roddiscraft, Inc., 345 Williams Ave., San Francisco; Roddiscraft, Inc., 720 Williams St., San Leandro • **Colorado:** Downs Supply Co., 2034 Market St., Denver • **Connecticut:** Spear-Newman, 635 New Park Ave., Hartford; Spear-Newman Inc., 67 Water St., New Haven • **Florida:** Atlanta Oak Flooring Co., 3511 Walnut St., Jacksonville; Roddis Company, 315 N.E. 73rd St., Miami; Rankin-Fisher, Inc., 60 N. Gertrude, Orlando; Floor Covering Distributors, 1413 Lozano, Box 2025, Tampa • **Georgia:** Atlanta Oak Flooring Co., 920 Glenwood Ave., S.E., Atlanta; Wm. M. Bird & Co., Inc., 604 Reynolds St., Augusta • **Hawaii:** American Factors, Ltd., Hilo; American Factors, Ltd., P.O. Box 3230, Honolulu; American Factors, Ltd., Kailua; American Factors, Ltd., Hanapepe, Kauai • **Illinois:** Bob Meyer Distributors, Inc., 4221-23 West Fullerton Ave., Chicago; Roddis Company, 3865 W. 41st St., Chicago • **Indiana:** Raups Tile & Cabinet Co., 2451 N. Meridan, Indianapolis • **Kansas:** Roddis Lumber & Veneer Co., Inc., 35-53 S.W. Blvd., Kansas City • **Kentucky:** Roddis Panel & Door Co., 1443 S. 15th St., Louisville • **Louisiana:** Tulane Hardwood Lumber Co., Choctaw Road, Baton Rouge; Tulane Hardwood Lumber Co., 4200 Tulane Ave., New Orleans • **Maryland:** Duraflex Corporation, 413 East 25th St., Baltimore; Eisinger Builders Supply, 1540 Rockville Pike, Rockville • **Massachusetts:** Roddis Plywood & Door Co., 229 Vassar St., Cambridge; Sanford Gold & Co., 359 Pleasant St., Fall River; Spear-Newman of Hartford, Inc., 64 Napier St., Springfield • **Michigan:** Roddis Plywood of Michigan, Inc., 13500 Rotunda Dr., Dearborn • **Minnesota:** Roddiscraft Minnesota, Inc., 635 Prior Ave., North, St. Paul • **Mississippi:** Cabell Electric Co., Jackson • **Missouri:** Roddis Company, 3344 Morganford Rd., St. Louis; Southern Supply Co., 505 E. Olive St., Springfield • **Nebraska:** Brinn & Jensen Co., 1110 Harney St., Omaha • **New Jersey:** Roddis Co., Inc., 103 Marsh St., Port Newark • **New Mexico:** Jay Grear, Inc., 1222 Edith Blvd. N.E., Albuquerque • **New York:** Rutland Lbr. Co., Inc., Stop 15, Albany-Sch'dy Rd., Albany; Roddis Plywood & Door Co., 920 E. 149 St., Bronx; Plywood Fabricators, 1294 E. Delavan Ave., Buffalo; Roddis Co., 1756 Plaza Ave., New Hyde Park, L. I.; Saltpoint Supply Corp., 539 Hiawatha Blvd., Syracuse • **North Carolina:** Roddis Panel & Door Co., 123 E. 27th St., Charlotte • **Ohio:** Roddis Panel & Door Co., 836 Depot St., Cincinnati; Roddis Panel & Door Co., 2717 E. 75 St., Cleveland; Wycoff Sales Co., 204 E. Mound, Columbus • **Oklahoma:** Caston Lumber Co., 4412 N. Western Ave., Oklahoma City • **Oregon:** C. A. Newell Inc., 2034 N.E. Sandy Blvd., Portland • **Pennsylvania:** Roddis Co., Inc., S.W. Corner Richmond & Tioga Sts., Philadelphia; Better Bilt Supply, Inc., 3614-36 Blvd. of Allies, Pittsburgh • **Rhode Island:** Sanford Gold & Co., 285 Fox Point Blvd., Providence • **South Carolina:** Wm. M. Bird & Co., Inc., 244 E. Bay St., Charleston; Wm. M. Bird & Co., Inc., Box 1324, Columbia • **Tennessee:** Atlanta Oak Flooring Co., 801 Bluff St., Chattanooga; Tennessee Metal Mouldings, 828-8th Ave., S., Nashville • **Texas:** Macatee, Inc., 4703 Bengal St., Dallas; Neff-Buckner-Holt, Inc., 600 West Paisano Dr., El Paso; Wm. Cameron Co., 1901 Cullen Blvd., Houston; Newsom Distributing Co., 301-26th St., Lubbock; George C. Vaughn & Sons, 628 Buena Vista St., San Antonio; Wm. Cameron Co., 24th & Mary Sts., Waco • **Utah:** Western Equipment Co., 928 S. Main St., Salt Lake City • **Virginia:** Williams & Reed, Inc., 283 Court St., Norfolk; Williams & Reed, Inc., 1401 E. Franklin St., Richmond • **Washington:** C. A. Newell Co., 933 Westlake Avenue N., Seattle • **Wisconsin:** Roddis Plywood of Mich., Inc., 4601 W. State St., Milwaukee.

Progress Is Our Most Important Product

GENERAL ELECTRIC



Griggs
school seating...





For the Classroom....

A SKYLINER No. 450 CHAIR DESK. The most beautiful, most practical school desk made. Top adjusts 3″ in height, with sturdy, tamper-free locking nut. Heavy drawing quality steel throughout welded into lasting unit. Comfortable, sturdy hardwood plywood seat, back, and desk top. Plastic faces for desk top available. Roomy book compartment (with or without fourth panel) has deep pencil trays. Rubber-cushioned steel glides.

B SKYLINER No. 520 TABLET ARM CHAIR. Finest seating made for study or lecture halls. Strong, but lightweight for easy moving. Comfortable with curved hardwood plywood seat and back. 12″ x 24″ tablet arm. Solid welded frame of deep drawing steel. Plastic faces for tablet arms available for long wear. Curved steel arm support rigidly braces tablet arm. With die-formed book compartment electronically welded as part of complete frame.

C SKYLINER No. 54[illegible] CHAIRS. Beautiful, streamlined Skyliner chairs – made with the same wear and comfort features of Skyliner Chair Desks and Tablet Arm Chairs. Hardwood plywood curved for comfort and correct posture is used throughout backs and seats. Deep drawing steel frame electronically welded for extra strength. Available, like all Griggs furniture, in a choice of five metal colors and two wood finishes. 15″, 13″, 15″, and 17″ seat heights.

D SKYLINER No. 525A TABLET ARM CHAIR. Beautiful Skyliner lecture hall seating for rooms where book storage is not needed. Comfortable hardwood plywood seat and back is curved for comfort. Sturdy, drawing steel frame electronically welded for lasting strength. Streamlined tablet arm, 24″ x 12″ allows easy access to seat. Rubber-cushioned metal glides on legs give long wear.

E PIONEER No. 200 CHAIR DESK. Durable, comfortable seating at a moderate price. Combine strength of steel with beauty of woods. Heavy die-formed steel frame electrically welded. Woods are hardwood plywood, bonded with waterproof glue, and curved for comfort in seat and back. Roomy 7-ply desk tops. Three seat heights: 17″, 15″, and 13″ cover all grades. Large book compartment.

F PIONEER No. 220 TABLET ARM CHAIR. Lasting lecture hall seating at a price you can afford! Heavy, die-formed and steel frame, electrically welded for strength. Comfortably curved hardwood plywood seat and back. Tablet arm, 12″ x 24″, is curved for easy access to seat, has rounded edges to prevent snagging of clothes. Roomy steel book compartment provides ample storage space for students.

All Griggs furniture available in five metal finishes: Beige, Taupe, Coral, Sage Green, or Ocean Blue and Natural or School Brown wood finishes.



G



H



I



J

for Classroom... Study Hall... Libraries...

GRIGGS No. 1800 ALL-PURPOSE TABLES. Sturdy, practical table with stoutly braced legs for a g, wobble-free life. Banded hardwood built-up tops. tic top facings available. Rubber-cushioned glides on egs.

mber	*Top Size*	*Book Compartments*	*Weight*
00-1	34″ x 72″	None	80 lbs.
00-2	30″ x 60″	None	60 lbs.
00-3	24″ x 48″	None	40 lbs.
00-4	34″ x 72″	6 – 3 per side	100 lbs.
00-5	34″ x 72″	2 on one side	90 lbs.
00-6	30″ x 60″	4 – 2 per side	80 lbs.
00-7	30″ x 60″	2 on one side	70 lbs.
00-8	24″ x 48″	2 on one side	50 lbs.

GRIGGS No. 1830 ALL-PURPOSE TABLES. Handsome, sturdy tables with beautiful unbanded with plywood facings. All tables available in heights 20″ to 30″. Strong, welded tubular frames for years ear. Rubber-cushioned metal glides on all legs.

del	*Top Size*	*Book Compartments*	*Weight*
30-3	24″ x 48″	None	35 lbs.
30-8	24″ x 48″	2 on one side	45 lbs.

H GRIGGS No. 1860 ADJUSTABLE TABLES. Only two table sizes answer every grade's needs. One table adjusts from 20″ to 25″ in height; the other from 25″ to 30″. All tables listed are made in both heights. Sturdy Allen nut leg adjustment.

Model	*Top Size*	*Top*	*Book Compartments*	*Weight*
1860-A-1	34″ x 72″	Banded	None	90 lbs.
1860-A-2	30″ x 60″	Banded	None	70 lbs.
1860-A-3	24″ x 48″	Unbanded	None	50 lbs.
1860-A-4	34″ x 72″	Banded	3 on 1 side	110 lbs.
1860-A-5	34″ x 72″	Banded	6 – 3 per side	100 lbs.
1860-A-6	30″ x 60″	Banded	4 – 2 per side	190 lbs.
1860-A-7	30″ x 60″	Banded	2 on 1 side	80 lbs.
1860-A-8	24″ x 48″	Unbanded	2 on 1 side	60 lbs.

J GRIGGS No. 1700 ROUND TABLES. Beautiful round tables for libraries, cafeterias, kindergartens, or group study. One-piece welded tubular steel frame. Smooth, hardwood plywood tops, beautifully finished. Plastic facings are available. Metal, rubber-cushioned glides on all legs.

Model	*Top Diameter*	*Height*	*Weight*
1710	42″	20″ to 30″	45 lbs.
1715	48″	20″ to 30″	50 lbs.



A



B



C



D



E

For Classrooms . . .

A GRIGGS MODEL No. 780-A STUDY TOP DESK. Sturdy, lightweight desk with a strong tubular steel frame. Front legs run from desk top corners straight to floor, eliminating forward tipping. Comfortable curved hardwood plywood seat, back. In 13″, 15″, and 17″ heights.

Pick a Color to Sparkle Your School! With Griggs school seating you can select a bright modern color that will make your rooms brighter . . . choose from five metal finishes . . . beige, taupe, coral, sage green, or ocean blue. Woods supplied in either clean, modern natural or rich school brown.

B GRIGGS No. 785-A STUDY TOP DESK. New Griggs model, offering rigid support of desk top direct to floor. Heavy gauge tubular steel frame. Comfortable curved hardwood plywood seat and back. Desk top may be plastic faced. In 17″, 15″, and 13″ seat heights. Steel leg glides.

C GRIGGS No. 789-A STUDY TOP DESK. Brand new – all the advantages of a sturdy tubular steel frame, *plus* an enclosed book box and a lift-lid desk top. Very sturdy, welded frame, plus the comfort features of curved seat and back and 18″ x 24″ roomy desk top, all of lasting hardwood plywood.

D GRIGGS AIRLINER No. 790 CHAIR DESK. It's brand new – a Griggs *tubular* steel chair desk. Circular desk top support makes rigid work top. Roomy, curved hardwood plywood seat and back. Plastic desk facing available. Made in 17″, 15″, and 13″ seat heights for every room in the school.

E GRIGGS AIRLINER No. 7[illegible] CHAIR DESK. Another brand new chair desk with the added advantage of a sturdy, roomy embossed steel book compartment. Steel frame curves under desk top to form rigid support. Correct posture is added by perfectly curved hardwood plywood seat and back. In 17″, 15″, 13″ heights.



F



G



H



I







J

...and Lecture Halls...

F GRIGGS AIRLINER No. 720 TABLET ARM CHAIRS. Lightweight, sturdy — perfect for lecture halls. Welded, tubular-steel frame, strongly supported. Tablet arm rounded for easy access to seat. Model 720-A without book rack, Model 720-AG (not shown) has steel book rack for storage.

G GRIGGS AIRLINER No. M2700 TWO-PUPIL TABLE DESK. Big roomy, two-pupil table with strong, tubular steel welded frame; big book compartments. Desk tops, 20″ x 44″ of hardwood plywood. Ten heights, from 20″ to 29″. Plastic desk top facings are available. Cushioned leg glides.

H GRIGGS AIRLINER No. 740 CHAIRS. Comfortable, durable, and correctly proportioned chairs for every room. Curved steel crescent bracing gives ample leg room. Backs and seats of curved hardwood plywood. Eight chair sizes from 11″ seat height to 18″.

I GRIGGS AIRLINER No. M700 TABLE DESK WITH M740 CHAIR. Over one million sold! Roomy, durable, practical. Rugh tubular frame with die-formed book box of heavy gauge embossed steel. Hardwood plywood desk tops; plastic facings if desired. Ten heights from 20″ to 29″.

J GRIGGS No. M750-L LIFT-LID TABLE. Handsome sturdy table desk with all the advantages of the completely enclosed book box. Heavy gauge tubular frame, die-formed steel book box. Smooth hinges allow easy lifting of lid; hold lid erect when open. Ten heights from 20″ to 29″.

Millions of Griggs Units in Schools! Airliner . . . Skyliner . . . Griggs trademarks of quality are in schools in every state. Over 1,000,000 Skyliner Chair Desks are in use . . . over 1,000,000 No. 700 Desks have been selected for schools. They'll be in use for years for they're built to last!





Make your entire community proud of your school auditorium with Griggs "Push-Back" Chairs, the most luxurious seating made. No need to rise when a latecomer comes into the row . . . simply push back the seat to give plenty of access room. Completely upholstered in fine fabrics; sturdy and comfortable coil spring seats, and a relaxing design, the "Push-Back" Chair creates the acme of comfort in your school. Tablet arms shown at right are available on all Griggs Auditorium Chairs.

Griggs will completely plan your auditorium for you – without obligation – without charge. Trained seating engineers will create detailed floor plan showing the maximum seating available giving clear, unobstructed views of the stage. Write to Griggs Equipment Company, Box 630, Belton, Texas, for any help needed in planning your auditorium.



A



B

for... Beautiful Auditoriums

A GRIGGS MODEL 50 MBW AUDITORIUM CHAIR. Fine, completely upholstered seating for odern school auditoriums. Automatically-rising seats ake access to rows easier. Full metal backs make uts last longer, provide protection both to the chair d occupant. Tastefully modern curved end standards rmonize with the interior of any auditorium. Solid el center standards provide a rigid support for chair; ure your installation a long life. Beautiful, lacquer sh hardwood arm rests add sparkling contrast with of the fine upholstery fabrics you may select.

B GRIGGS MODEL 50 BW AUDITORIUM CHAIR. Handsome modern styling with the combined comfort of a deep upholstered seat and a curved, hardwood plywood back. Automatically-rising seats move up out of way when occupant rises . . . permits easier access to rows. Striking-modern curved end standards give your auditorium a smart, streamlined appearance. Sturdy, solid steel center standards make Griggs auditorium chairs a long-lasting investment; protect your installation against damage. Hardwood arm rests in beautiful lacquer finish. You may select your seat upholstery from a full line of choice fabrics and plastics.

riggs Auditorium Seating will enhance the decor of your auditorium. Griggs seating specialists will work with your architect throughout the planning stages; aid in selection of chair style, metal colors, and just the right color and type of upholstery material. This extra service is yours for the request – write to Griggs today!



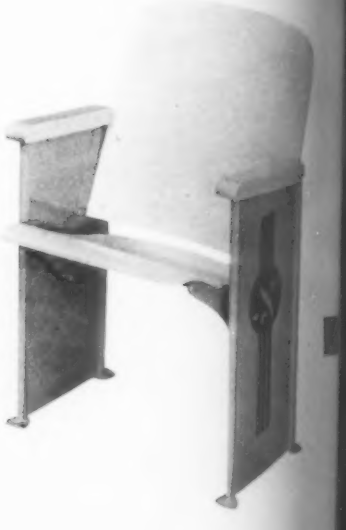
A



B



C



for Beautiful, yet Economical Auditorium Seati

A GRIGGS MODEL 71 BW AUDITORIUM CHAIR. Thorough seating comfort at a moderate price combining both eye appeal of modern styling and the luxury of a cushioned seat. Curved hardwood plywood backs allow seat occupants to relax completely. Deep cushioned seats upholstered in your choice of a large selection of fabrics and plastics. Handsome curved end standards for eye-catching beauty; solid steel center standards for durability through years of hard wear . . . provide rigid support and long life. Hardwood arm rests in lacquer finish.

B GRIGGS MODEL 71 A AUDITORIUM CHAI An economical chair in the Griggs line that gi you the beauty of modern, curved end standards, and t comfort that comes with *correctly-proportioned* hardwo plywood seats and backs. Steel end standards of the lat streamlined design; solid steel center standards that a built with rugged strength to make your seating last a last for years. Highest grade of baked-on enamel fini on metals resists wear and damage through years hardest usage. Hardwood arm rests in gleaming lacqu finish.

C GRIGGS MODEL 12 BW AUDITORIUM CHAIR. A low-priced chair with a comfortably upholstered seat. If you're watching seating costs closely in your auditorium, yet want the comfort of an upholstered seat . . . select the Model 12 BW. Choose your upholstery material from a wide selection of fabrics and plastics. Straight, handsome solid steel end and center standards throughout. Curved, hardwood plywood back of *correct proportions* for comfort. Metal parts finished in finest grade of baked-on enamel for years of wear. Hardwood arm rests in lacquer finish.

D GRIGGS MODEL 12-A AUDITORIUM CHAI The chair to select if your seating budget is tight you want the advantages of Griggs outstanding com *and* durability. Both seat and back of chair are of form and curved hardwood plywood; of just the right propo tions to keep occupants comfortable. Long-lasting w steel end and center standards designed to give you se factory wear. All metal parts finished with tough, durab baked-on enamel that will resist abuse and keep a ne looking appearance. Hardwood arm rests in lacquer fi


IDEAL
DEAL SEATING COMPANY GRAND RAPIDS, MICHIGAN

Over one million units of public seating have been manufactured by the Ideal Seating Company of Grand Rapids, Michigan and have been installed all over the world. For a quarter of a century Ideal Seating Company has been known for fine quality and service.

auditorium seating

Ideal Seating Company today manufactures a most complete line of highest quality auditorium seating. A range of combinations from the modest but high quality all veneer chair to the most luxurious spring back loge chair is available in each of two distinct structural types, one embodying cast iron standards, the other steel standards. Both lines offer either high coil or arch type serpentine spring seat constructions. Every Ideal chair affords the maximum in sitting comfort through proper posture.

Our deluxe models offer a unique seat lifting hinge. It is silent, frictionless and full compensating. The absence of all metal to metal friction eliminates wear and the necessity of periodical greasing or oiling. Here is a remarkable advance in engineering for the most important part of an auditorium chair.

You see illustrated a few of the combinations possible. Our representative in your territory can show you samples and point out the many more values not described here. He is capable of working out the details of your special needs through close contact with the factory. We are certain that we can satisfy any requirement in auditorium seating that you may have and correctly solve any problems with which you may be faced. Do not hesitate to use our complete planning department. Our engineers are ready to provide you with complete information. No obligation, of course.

classroom seating

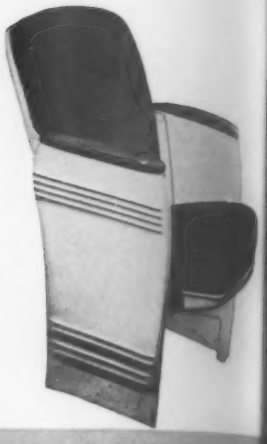
A new field of endeavor, Ideal has now built into classroom furniture the same high quality with which its auditorium chairs are identified. Functional, durable, economical, these tubular steel units fulfill the chair and desk trends of the modern classroom.

- Welded Tubular Frame
- Tubing — 1 inch O.D. x 18 gauge furniture grade — cold rolled electric welded
- Baked enamel on steel
- 3-coat lacquer on wood
- Silent cushioned steel glides
- Variety of modern classroom colors

for auditoriums



Chief "800"



Universal "300"

CHIEF "800"

Back — Long extended steel back panel designed to protect the upholstering material at the top and sides, also protect the seat from behind when in a raised or sitting position.

Seat — Available with either 16 spring high coil or improved 6 spring arch type serpentine constructions. Seat covers readily replaceable without the use of tacks, clips or tools.

Standards — Cast grey iron end and panel center standards. Available in riser attached types.

Hinges — The Wonder Frictionless

Arms — Solid hardwood or upholstered. This chair incorporates cast iron where is necessary and steel where flexibility needed.

UNIVERSAL "300"

Combines the luxury and engineering features of the Chief Line with less expensive steel end and center standards, solid panel floor.

for classrooms



DESKS — Lift Lid CR 200 Open Front CR 100

Tops of solid maple or birch plywood, and plastic.

Wood or metal bookshelf.

Silent, self-closing, adjustable friction hinges on lift lid.

Maximum strength, minimum weight.

Simple, clean design — no-snag, no-trip protection.

Inside desk-wide pencil tray.

Desk Height (inches) — 29, 28, 27, 26, 25, 24, 23, 22, 21, and 20.

Top Size (inches) — 18 x 24.

CHAIR — CR 500

Large plywood or solid birch or maple. Compound curve plywood or solid wood die seat.

Minimum of joints, fastening approved no-snag, no-trip protection.

All-purpose student's desk, teacher's cafeteria reading circle, etc.

Fatigue reduction through correct posture control.

Combining light weight with perfect Chair Height — (inches) — 14, 13, 12, and 11.



Challenger "500"



Universal "200"



All Veneer

LLENGER "500"

oised value in a medium priced chair.

ion standards and manually operated

ion ball bearing hinges.

IVERSAL "200"

ines essentials and versatility of Chal- er "500" with less expensive steel stand-

Available with high coil or arch type serpentine spring seats.
Wide variety of combinations possible for every seating requirement and budget.

ards and manually operated steel ball bearing hinges.

FOR ECONOMY

Chairs with plywood backs and seats offered in both Challenger "500" and Universal "200" lines.

5 ply 7/16" or 7 ply ¾" backs and 5 ply 7/16" seats.

All hardwood construction. Face ply selected Northern birch or maple.

Protective extruded aluminum binding available for all plywood backs and seats.

Automatic seat lifters can be furnished for plywood seats in Challenger "500" line.







ET ARM CHAIR — CR 300

easily movable.

mable while encouraging correct writing

on bracing especially designed to maximum rigidity, offset for more leg

ble with left hand arm.

ed with bookshelf — CR 300 B.

Size (inches) — 12 x 23½.

Height (inches) — 18, 17, and 15.

CHAIR DESK — CR 400

Versatile.
Maximum writing area and comfort in light, easily movable unit.
Unique desk top bracing providing optimum in rigidity, offset for more leg room.
Solid or plywood seats, backs and tops; also plastic top.
Bookshelf if desired — CR 400 B.
Pencil groove.
Desk Height (inches) — Edge nearest pupil, 26, 25, 24, 22, 21, 19, and 18.
Top Size (inches)—16 x 22, 14 x 20, 12 x 18.
Chair Height (inches) — 18, 17, 16, 15, 14, 13, and 12.

TABLET ARM
for Lecture Auditorium

Arm folds automatically when occupant rises. Arm automatically returns to under-seat position.

Arm can be raised or lowered when occupant is seated.

Can be furnished with Chief and Challenger Line Chairs.

All veneer combination shown, can be furnished in full and semi upholstered combinations also.

stadiums, field houses, gymnasiums



A rugged chair of clean functional design affording the maximum in comfort and durability.

Heavy cast iron standards, riser or floor attached.

Three slat compound curve backs and five slat compound curve seats, both steam bent hard wood. Back slats properly housed and bolted to the standards. Seats of steel dowel construction or slats individually attached.

All wood parts treated with rot inhibiting preservative and finished in force dried enamel. Castings properly cleaned and finished in baked enamel.

Cast iron manually operated or self lifting ball bearing hinges. Rust resistant hardware.

churches



This type of seating furnished in a wide variety of styles ranging from plywood back and seat chairs to the deluxe full upholstered types.

Pew ends available in design to conform to any type of architecture. Many effective combinations also obtainable by using our arm-height wood or cast iron end standards.

The comfort and convenience of individual seating costs no more and actually increases comfortable capacity. Kneelers, book racks and other accessories optional. You will be agreeably surprised when you compare.

list of installations

ALABAMA — Livestock Coliseum, Montgomery.

ARIZONA — Phoenix Junior College, Phoenix.

CALIFORNIA — Mark Keppel High School, Alhambra; Beverly Hills High School, Beverly Hills; David Starr Jordan Jr. High School, Burbank; Luther Burbank Jr. High School, Burbank; 29th Street Church of Christ, Scientist, Los Angeles; Marina Junior High School, San Francisco.

COLORADO — Adams State College, Alamosa; Hebrew Educational Alliance, Denver; Municipal Auditorium Annex, Denver.

CONNECTICUT — Williamantic State Teachers College, Williamantic.

DELAWARE — Caesar Rodney School, Camden.

DISTRICT OF COLUMBIA — U.S. Naval Medical Center, Washington.

FLORIDA — Florida State University, Tallahassee.

ILLINOIS — Canton Senior High School, Canton; Intermediate School, Riverside; Scott Hall, Northwestern University, Evanston; U.S. Naval Hospital, Great Lakes.

INDIANA — Music Hall, Purdue University, Lafayette; Dr. Norman Beatty Hospital, Westfille.

IOWA — Memorial Auditorium, Burlington; Iowa City High School, Iowa City; High School, Muscatine; Consistory Auditorium, Sioux City.

KANSAS — University of Kansas, Medical Center, Kansas City.

KENTUCKY — 9th and "O" Street Baptist Church, Louisville.

LOUISIANA — Southeastern Louisiana College, Hammond.

MARYLAND — Hereford High School, Baltimore; Allegany High School, Cumberland.

MASSACHUSETTS — Boston Conservatory of Music, Boston; Junior-Senior High School, Falmouth.

MICHIGAN — University of Michigan Lecture Auditoriums — Couzens Hall, Natural Science Bldg., Out Patient Clinic Bldg.; Temple Baptist Church, Detroit; 1st Church of Christ, Scientist, East Lansing; Calvary Baptist Church, Muskegon; Ahavas Israel Congregation, Grand Rapids; Grand Rapids Stadium, Grand Rapids; 1st Baptist Church, Pontiac; 35 Auditoriums for Detroit Board of Education, Detroit; Detroit Unity Association, Detroit.

MINNESOTA — Gym-Auditorium, Stephen.

NEBRASKA — University of Nebraska, Temple Theatre Bldg., Lincoln; Omaha Municipal Auditorium, Omaha.

NEW JERSEY — Hamids Million Dollar Pier, Atlantic City.

NEW MEXICO — Los Alamos Auditorium, Los Alamos.

NEW YORK — State Teachers College, Albany; Kleinhan's Music Hall, Buffalo; University of Buffalo, Schools of Medicine and Dentistry, Buffalo; Maryvale High School, Cheektowaga; State Teachers College, Fredonia; United Nations Trusteeship Council Chamber, New York; State Teachers College, Oswego; State Teachers College, Potsdam; High School and Grade School, Skaneateles.

NORTH CAROLINA — University of North C… lina, Chapel Hill.

OHIO — Beulah Park Jockey Club, Colu… Mohawk School, Columbus; Highview School, … ton; High School, Norwalk.

OKLAHOMA — East Central State College, … Oklahoma A & M College, Stillwater.

OREGON — Chemawa Indian School, Che…

PENNSYLVANIA — Jenner-Boswell School, … well; Senior High and Elementary School, … City; Edison Junior High School, Ne… Indiana State Teachers College, Indiana; … School, Millcreek Township; State Teachers … lege, Millersville; Springfield Township … School, Montgomery County.

TEXAS — A & M College of Texas, College … tion; Liberty Hall, El Paso; North Side Cat… Fort Worth; Wheatley Senior High School, Ho… Yates High School, Houston; Lon Morris Col… Jacksonville.

UTAH — Price Civic Auditorium, Price; Br… Young University, Chapel and Religious Educ… Bldg., Provo.

VIRGINIA — Bluefield Municipal Bldg., Blu… Joint Negro High School, Charlottesville; … den-Sydney College, Hampden-Sydney.

WEST VIRGINIA — Greenbrier Auditorium, … ford General Hospital, White Sulphur Spr…

WISCONSIN — State Teachers College, La C… Milwaukee Municipal Stadium, Milwaukee; … consin State College, Platteville.

IDEAL SEATING COMPANY

Grand Rapids, Michigan

REPRESENTATIVES IN ALL PRINCIPAL CITIES

D 3/Ku

KUEHNE
SAY (KEE NEE)

WORLD'S LARGEST MANUFACTURERS OF TUBULAR FURNITURE

THE NEWEST NAME IN

school furniture

is the most respected name in tubular furniture

WITH NEW MODERN FUNCTIONAL DESIGNS



Glare proof— heat resistant— mar-resistant tops of G.E. Textolite

Back and seat curved for maximum comfort— Posture perfect

Strong lightweight modern tubular steel construction

Easy access to book basket from front or side

Green, grey and satin chrome finishes. Gracefully tapered legs

Self-leveling glides make moving easy and safe

LOOK TO KUEHNE FOR "LONG RANGE" MODERN FURNITURE

KUEHNE

SAY (KEE-NEE)

POSTURE CORRECT AND MOD GN

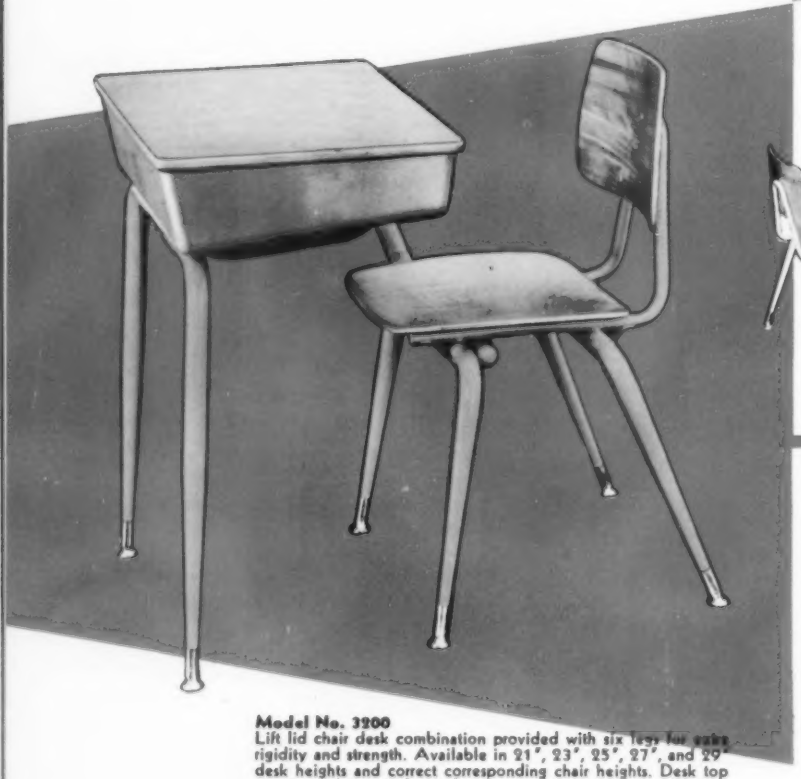
schoo

Never before has strength and durability taken on such beauty and comfort. Today Kuehne brings 32 years of tubular and plastic furniture manufacturing ability to the school room and gives it up-to-date design that will be modern for years to come. Incorporated in every unit of Kuehne school furniture is the practical beauty, versatile design, durability and comfort demanded by schools, colleges and universities.

Spontaneous interest and praise have come from educators, administrators and architects all over the country who have seen the Kuehne Line. Look at these features and styling . . . See why you should specify Kuehne for your school classrooms.



Model No. 1200—Popular chair desk with 18" x 24" trapezoidal writing surface, supported by arm of double bar construction. Book basket is accessible from front or sides. Available in various heights and right or left models.



Model No. 3200
Lift lid chair desk combination provided with six legs for extra rigidity and strength. Available in 21", 23", 25", 27", and 29" desk heights and correct corresponding chair heights. Desk top size is regulation 18" x 24".



Model No. 3200



Model No. 1000
Stacking chair and compan
Model No. 2200 lift lid d





Model No. 3000
Study top combination, prov
legs for extra rigidity and st
able in 21", 23", 25", 27", a
heights and correct corresp
heights. Chair design provid
to book basket accessory fro
Desk top size measures 18" x

Send for the KUEHNE catalog--be sure of getting all

GIVE LONG LIFE CONSTRUCTION — BUDGET PRICED

urniture





Model No. 4200
Front and rear view of teacher's double pedestal desk. Top of G. E. Textolite measures 30" x 60". Steel drawer cabinets house solid oak drawers with removable partitions. Lock for island drawers.



Model No. 4110
Front and rear view of single pedestal desk. Available in right or left model, G. E. Textolite top 30" x 48". Steel drawer cabinets house solid oak drawers with removable partitions. Lock for island drawers.



...book box desk comes
..., 25", 27", and 29"
...Book box provides
...as well as 5" front
...Top measures 18"



Model No. 2200
Lift lid student desk providing deepest storage space, 5" deep in front and 4" deep in rear. Pencil tray at left. Available in 21", 23", 25", 27", and 29" desk heights.

KUEHNE



...desk comes in 21", 23",
...and 29" desk heights.
...18" x 24" horizontal
...top tops allows large
...when several desks are



Model No. 1000
Stacking chair providing companion for open book desk, study top desk and lift lid desk. Available in eight seat heights, 11" to 18".



Model No. 1300
Arms for chair are optional at extra cost at time of purchase or can be added at later date.



Model No. 5100
All purpose table with G. E. Textolite top available in 30" x 48" and 60" sizes, and 21", 23", 25", 27", and 29" heights. Roomy book box optional. Also made trapezoidal shape.

...on America's smart new line of school furniture.

Check these features! . . . See why Kuehne school furniture is today's outstanding buy.

TOPS AND WORKS SURFACES — Decorative laminated plastic meeting general N. E. M. A. heat and solvent resistance specifications. Lift Lid and Study Top desks permit groupability and are designed to occupy a minimum of space. Lift lid desk tops provide two positions; slanted for writing comfort and horizontal for working and crafts. All student desk tops measure 18" x 24" and are covered with mar and wear resistant G. E. Textolite in birch or non-reflective green finish, mounted on 11 ply hardwood core.

LEGS AND UNDER STRUCTURE — Constructed of heavy tubular steel so that it is inherently resilient to provide strength and stability. Legs are made of heavy gauge tempered steel tubing, swaged for strength to a straight taper. All understructure parts are resistance-welded into one free standing structure.

All legs are equipped with self-leveling case hardened rubber cushioned steel floor glides, large enough to help resist the denting of asphalt or rubber tile floor surfaces. Glides are held in tubing with steel grip plate.

Legs are positioned so that book basket is easily accessible from front or side.

BACKS AND SEATS — All wood parts have a baked finish of a highest quality synthetic finish suitable for hard classroom use.

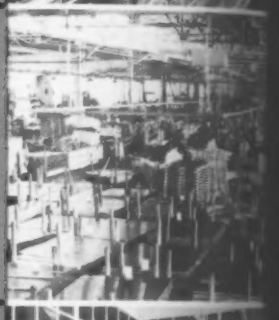
BOOK SHELVES AND BOXES — Book boxes and shelves are made of deep drawn steel stamping. Extra deep measurements are 4" at back and 5" at front.

BOOK BASKET — Mounted under chairs are made of heavy gauge wire and are resistance-welded.

COLORS — Tubing in metallic mist grey, spring green, or non-reflecting polished satin chrome. Tops in birch or crackle green. Modesty panels on teacher's desks in grey or coral.



Tube Mill—One of tube making machines in the KUEHNE plant. Steel enters at the right as flat stock and comes out in tubing at left.



Tube Shaping — Tubing from mill awaiting shaping. Note conveyors carrying shaped tubing. Conveyors are used extensively throughout the KUEHNE plant.

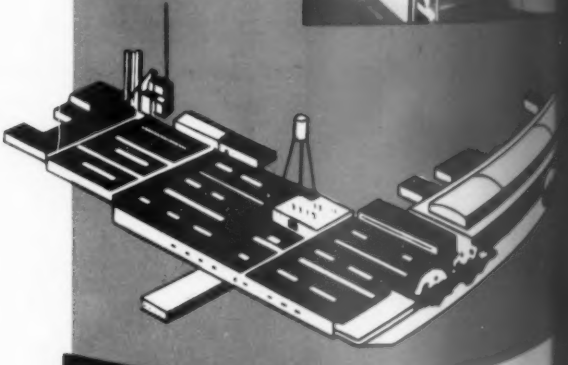


Laboratory at KUEHNES. Guardians of quality are the chemists and metalurgist at KUEHNE. Judicious watch is kept on all KUEHNE processes and finishes.



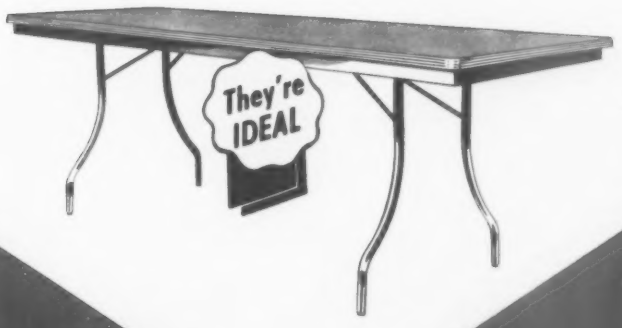
One of the world's largest fully automatic chrome plating machines in operation at KUEHNES. Large volume is needed to meet tremendous KUEHNE production schedules.





KUEHNE
manufacturing company

MATTOON ILLINOIS



Folding Furniture

FOR SCHOOLS, RESTAURANTS, HOTELS, CHURCHES, INSTITUTIONS . . .

Metwood Hanover

FOLDING TABLES

TRI-BALANCE STRENGTH

Strength in a table or bench is important. But Metwood-Hanover tables bring you far more than strength, alone: Exclusive Tri-Balance Design means maximum strength at minimum weight . . . strength without sacrifice of comfort and ease of handling. Metwood-Hanover tables stack and store in minimum space . . . finest automatic locking device . . . no leg-interferance at EITHER END OR AT SIDES. These are a few of the pluses that combine with traditional Metwood-Hanover craftsmanship to bring you the finest table ever developed—at no increase in price over ordinary folding tables and benches. With over 25 years of folding table craftsmanship and know-how behind them . . . these products provide utmost flexibility and unmatched precision workmanship. Conversion of rooms is immediate: a cafeteria or dining room is folded away to become a gymnasium or ball-room . . . a meeting-room is instantly equipped for multiple-purposes . . . . the lobby is furnished for registration . . . an ordinary room doubles as a display room and so on. We could fill this catalogue with examples. Metwood-Hanover is famous for attention to detail:

★ Nickle plated Floor Glides can be replaced with rubber feet, if desired, at slight cost.

★ All high-pressure plastic tops laminate (NEMA Standard) available in full range of colors in both linen and mother of pearl patterns and in a selection of wood patterns.

★Finish on metal parts (aprons and legs): Choice of metallic grey, brown, beige, light gray, brown.

★Leg Locks: Metwood-Hanover bracing and locking device is unique in having no wearing parts. Leg braces of 5/16" round steel are securely rivited to legs, and fit into cast aluminum lock which will hold solidly in position at all times . . . no matter how often the table is folded and set up. Safest, easiest lock to operate . . . used on Metwood-Hanover Standard and Budget Lines.



folding tables

standard line



A quality line for use in rooms where better-than-average folding table is desired. Made with utmost care of first quality materials and designed to be both handsome and rugged.

budget line



A lower cost, quality table without sacrifice of design strength or craftsmanship. For rooms where table appearance is not the supreme standard.

Metwood Hanover
FOLDING TABLES

model	top surface and frame	finish
A-1	1/16" high pressure laminated plastic on 5/8" Douglas fir plywood or 3/4" novoply.	
B-1	1/4" Birch plywood on 5/8" Douglas fir Plywood	sealer and clear lacquer
B-1M	Marlite (plastic on masonite) on 5/8" Douglas fir plywood	
M-1	1/8" tempered Duolux masonite on 1/2" Douglas fir plywood	oil wax stain
P-1	5/8" Douglas fir plywood	oil wax stain or clear lacquer

lengths: 96", 72", 60", 48", 36"
widths: Standard: 36", 30". Other widths also available.
heights: 30" or as ordered

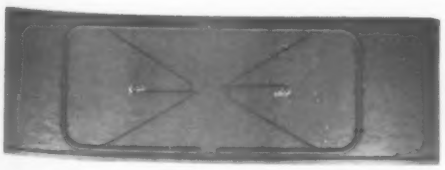


construction

All "Standard Line" folding tables are equipped with 1-¾" or wider 18 guage C. R. steel aprons, welded into one piece. Tops are banded with "T" type extruded aluminum moulding. Legs are of 1" O. D. high carbon steel tubing, with .076" wall, and shaped to assure knee-free seating at both ends and at sides of tables.

P1	5/8" Douglas fir plywood	oil wax stain
P1M	1/8" tempered Duolux Masonite on 1/2" Douglas fir Plywood	oil wax stain

lengths: 96", 72"
widths: 36", 30"
height: 30" or as ordered



construction

All budget line tables are reinforced with 1-¼" 18 gauge C. R. steel channels. Tops are banded with "T" extruded aluminum moulding. Legs are "U" type, made from 1" O. D. high carbon steel, with .076" wall.

utility tables

Models HS-1 and HS-2: rectangular or square shape.

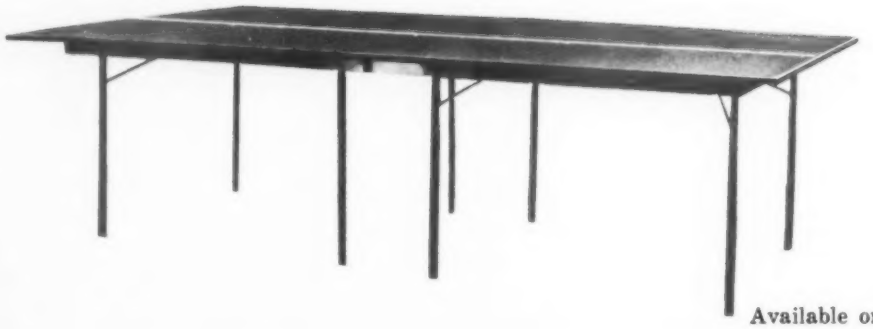
Models HS-3 and HS-4: square





These tables are for general use in rooms where folding
a needed feature. Made with the same precise care, and as
designed, as the Standard Line, but with fixed legs.

tennis tables



Available one-piece or two-piece, equipped with full steel
aprons and legs designed to lock the same as Standard Line
Tables. Tops are sealed, sanded and finished with best
lacquer with white lacquer lines.

round tables



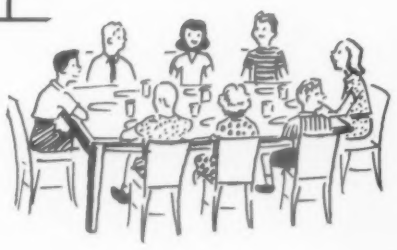
model	*top surface and frame*	*finish*	*si*
RA-1	1/16″ high pressure plastic on 5/8″ Douglas fir plywood or 3/4″ novoply	Choice of patterns and colors	48″
RM-1	1/8″ Duolux Masonite on 1/2″ Douglas fir plywood.	oil wax stain	48″, 60
RP-1	5/8″ Douglas fir plywood	oil wax stain or clear lacquer	48″, 60
RPR	same as RP-1 but with no moulding		

heights: 30″ or as ordered

Metwood Hanover
FOLDING TABLES

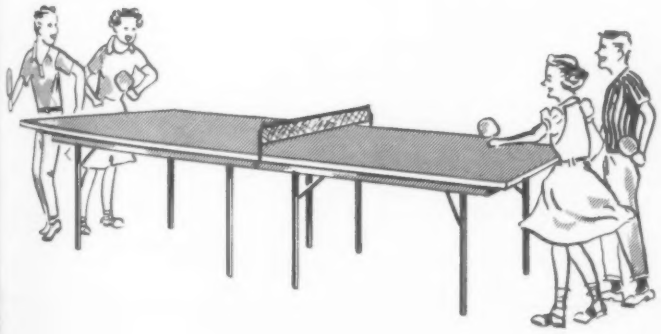
model	top	apron	legs
HS-1	1/16″ high pressure plastic laminate (NEMA Standard) on 3/4″ Douglas fir plywood or 3/4″ novoply, banded with "T" type aluminum moulding. Total top thickness, 13/16″.	solid hardwood, 3-3/4″ x 3/4″ with wood corner blocks notched into apron, securely fastened & glued	4, solid hardwood, 2-1/4″ tapered to 1-1/2″ with outside corners rounded
HS-2	same as HS-1, but with 1-3/16″ thick top. lengths: 96″, 72″, 60″, 48″ widths: 36″, 30″	heights: 30″ or as ordered	
HS-3	hardwood plywood, 5 ply core stock, banded with "T" type extruded aluminum moulding.	*finish* high quality furniture in choice of colors	*pedestal* 5″ hardwood fitted with 4 legs
HS-4	1/16″ high pressure plastic laminate (NEMA Standard) on 3/4″ Douglas fir plywood or novoply.	choice of colors and patterns	

Square Table, size 36″ x 36″ Heights: 30″ or as ordered



HS-1 and HS-2. Leg bolts mounted to inside of top corner of leg for attachment to corner blocks of apron assuring a solid leg at all times. Shipped K. D.

HS-3 and HS-4: Pedestal and top doweled and glued. Shipped K. D. HS-3 and HS-4 are equally ideal for restaurants, hotel dining-rooms, and faculty dining rooms in schools and colleges.



model	top construction
T-5	one-piece, 60″ x 108″, 5/8″ Douglas fir plywood, full 1-3/4″ steel channel apron
T-5M	one-piece, 60″ x 108″, 1/8″ Duolux Masonite on 1/2″ Douglas fir plywood.
T-52	same top-construction as T-5, except made in 2 sections for convenient handling, as illustrated
T-52M	T-5M top, but made in 2 sections

card tables



model	top surface and frame
CM-1	1/8″ Duolux Masonite on 1/2″ Douglas fir plywood
CA-1	1/16″ high pressure plastic laminate (NEMA Standard) on 5/8″ Douglas fir plywood or 3/4″ novoply.

For heavy duty, frequent use . . . sturdy economical . . . outwear average card tables many times over. Full 2-¼″ steel channel apron and "T"-type aluminum moulding. "U" type legs of 1″ O. D. high carbon steel tubing. 30″ x 30″ x 27″ high. Made with the same precision features as Standard Line Folding Tables.

folding benches



table trucks





stage units



Available in all sizes to fit needs for stands for dramatic, cho
orchestra and general usage. Made with the same attention
strength finish and utility as all Metwood-Hanover school produ

Metwood Hanover

ywood-Hanover folding benches give full flexibility to folding bles in school rooms by providing seating that is sturdy, safe, ht and both transportable and easily stored. Folding benches e made in one model, BM-1. Tops are ⅛" Duolux Masonite on " Douglas Fir plywood, having a full 1-¾" steel channel apron, d 1" O. D. high carbon steel legs fitted with standard Metwood-nover lock. Standard height, 18"; can be lowered at no extra t. Bench tops to match table tops can be furnished at extra cost.





le trucks increase the usefulness of folding tables and benches providing a simple means of storage and transportation. et areas can be anywhere in the building . . . folding units will ys be handy for every room without unnecessary handling and king. Available for either flat or edge stacking and for round n and stage units. Equipped with 4 bassick swivel castors giv- free movement in any direction.

el JR-1 for flat or edge stacking of 12 to 14 tables up to 8 ft. g. Frame is ⅛" x 2" x 2" steel angle. Battens 1-¼" x 4" hard-d. Handles 1" O. D. high carbon steel tubing. Four bassick vel casters.

el JR-2 heavy duty truck for round tables up to 72" diameter ll size stage units. Edge stacking. Easy side loading with city of ten units. Frame is 1-½" O. D. steel tubing. Battens 1-¼" x 6" hardwood. Four bassick swivel castors.



nstruction

-¾" Douglas fir plywood, sealed and sanded. Finished with two oats of highest quality lacquer and banded with "T"-type aluminum moulding.

on—1¾" or wider so that legs recess inside apron for safe, easy stacking. 18 gauge C. R. steel channel, extra channels full length in center of units.

—1" O. D. high carbon steel tubing . . . .076" wall, braced and locked the same as the Standard Line with three pairs of legs per unit. Rubber feet.

ts—from 8" up, providing various levels as required.

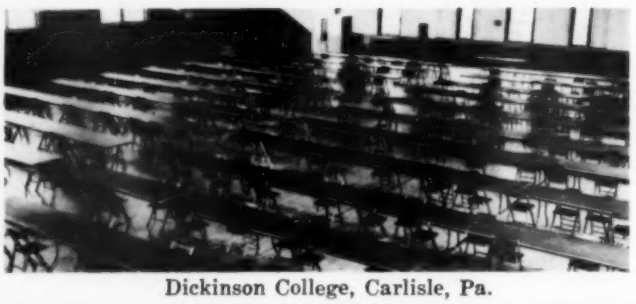
ds—plywood enclosure panels available.



representative users

Selma Country Club, Selma, Ala.
Central Baptist Church, Decatur, Ala.
Phenix City Schools, Phenix City, Ala.
El Dorado School Dist. #15, El Dorado, Ark.
University of California, Berkeley, Calif.
Bellflower School Dist., Bellflower, Calif.
American Legion Post No. 61, Sacramento, Calif.
Cong. Rodeph Sholom, Bridgeport, Conn.
Highland Park School, Manchester, Conn.
Y. M. C. A., Outdoor Center, North Colebrook, Conn.
Corpus Christi Church, Wilmington, Del.
Board of Public Education, Wilmington, Del.
Selbyville Volunteer Fire Co., Selbyville, Del.
St. Peters R. C. High School, New Castle, Del.
Dutch Shoppe, Laurel, Del.
Salvation Army, Washington, D. C.
Adas Israel Congregation, Washington, D. C.
National Academy of Sciences, Washington, D. C.
National Lutheran Home, Washington, D. C.
Presbyterian Student Center, Gainesville, Fla.
Sarasota County B. P. I., Sarasota, Fla.
Post Office, Atlanta, Ga.
McDonough Elementary School, McDonough, Ga.
National Red Cross, Headquarters, Washington, D. C.
Y. W. C. A., Atlanta, Ga.
Bibb Mfg. Co., Columbus, Ga.
School Dist. #1, Nez Perce, Lewiston, Idaho
Greek Orthodox Church, Chicago, Ill.
Community High School, Crystal Lake, Ill.
Polish Falcons Nest #42, Chicago Heights, Ill.
Jewel Tea Co., Barrington, Ill.
St. Johns Parish, Vincennes, Ind.
Switz City Cafeteria, Switz City, Ind.
Evangelical U. B. Church, Ames, Iowa
Clarion Insurance & Realty Co., Clarion, Iowa
State Arsenal, Topeka, Kans.
Boeing Airplane Co., Connell, Kans.
Holy Family Church, Louisville, Ky.
First Unitarian Church, Louisville, Ky.
St. Francis Xavier Church, Baton Rouge, La.
Cathedral Rectory, Portland, Maine
Helen King Junior High School, Portland, Maine
American Legion Auxiliary, Winthrop, Maine
K of C, Baltimore, Md.
St. Leo's Church, Baltimore, Md.
Pikesville Armory, Pikesville, Md.
C & P Telephone Co., Cumberland, Md.
Dept. of Conservation Marion, N. C.
Naval Academy, Annapolis, Md.
Board of Education, Westminster, Md.
Happy Valley Camp, Port Deposit, Md.
Aberdeen Proving Ground, Aberdeen, Md.
Chestertown Volunteer Fire Co., Chestertown,
Westboro School Dept., Westboro, Mass.
St. Josephs School, North Adams, Mass.
Town Hall, Rowe, Mass.
First Congregational Church, Turners Falls,
The Country Club, Brookline, Mass.
Northeastern University, Boston, Mass.
Post Office, Flint, Mich.
St. Paul's Church, Grosse Pointe, Mich.
Morrice Consolidated School, Morrice, Mich.
St. Boniface School, Melrose, Minn.
Trinity Episcopal Church, Natchez, Miss.
Falls Hotel, Great Falls, Mont.
Congregation of Temple Israel, Omaha, Nebr.
Scottsbluff Lodge #1367 B. P. O. E., Scottsbluff,
Hotel Carpenter, Manchester, N. H.
Seaview Country Club, Absecon, N. J.
Cherry Hill Inn, Haddonfield, N. J.
First Presbyterian Church, Mount Holly, N. J.
Almagamated Clothing Workers Cornwall, Pa.

Magnetic Metals Co., Camden, N. J.
V. F. W. Post., Millville, N. J.
St. Patrick's School, Woodbury, N. J.
White Horse Fire House, Trenton, N. J.
Esso Standard Oil Co., Linden, N. J.
Arlington Hotel, Binghamton, N. Y.
Columbia University, New York City
Epworth Methodist Church, Jamestown, N. Y.
Board of Education, Walden, N. Y.
U. S. Military Academy, West Point, N. Y.
Masonic Order, Western Star #15, Bridgewater, N. Y.
Post Special Service, Fort Bragg, N. C.
Thomasville Community Center, Thomasville, N. C.
B. P. O. E., Salisbury, N. C.
Parkens Drive-In, Rocky Mount, N. C.
Four "H" Camp Club, Waynesville, N. C.
First Baptist Church, Salisbury, N. C.
Elida High School, Elida, Ohio
Woman's Society of Christian Service, Barnesville, Ohio
Hollenden Hotel, Cleveland, Ohio
Board of Elections of Cuyahoga County, Cleveland, Ohio
St. Rocco's R. C. Church, Cleveland, Ohio
Y. M. C. A. & Y. W. C. A. Cleveland, Ohio
Catholic Youth Org. Camp, Madison, Ohio
First Methodist Church, Lindsay, Okla.
Pleasant Hill School, Oklahoma City, Okla.
Phillips Petroleum Co., Bartlesville, Okla.
K of C, McSherrystown, Pa.
Church of the Good Shepherd, Camp Hill, Pa.
Dickinson College, Carlisle, Pa.
Carlisle Shoe Co., Carlisle, Pa.
Sons of Italy, Brownsville, Pa.
First Lutheran Church, Chambersburg, Pa.
Sterling Hotel, Wilkes Barre, Pa.
State Teachers College, California, Pa.
Jaffa Temple, Altoona, Pa.
V. F. W., Johnstown, Pa.
L. G. M. Club, Coatesville, Pa.
Holiday Motel, Mechanicsburg, Pa.
Enola Fire Co. No. 1, Enola, Pa.
Zembo Temple, Harrisburg, Pa.
M. W. Wood, Caterer, Allentown, Pa.
Minneapolis Honeywell Regulator Co., Phila, Pa.
Nativity BVM School, Philadelphia, Pa.
Eldredge School, East Greenwich. R. I.
Town of Cumberland, R. I.
Gallman High School, Newberry, S. C.
Lake City Methodist Church, Lake City, S. C.
Redfield Methodist Church, Redfield, S. D.
Broadway Baptist Church, Knoxville, Tenn.
Englewood High School, Englewood, Tenn.
Farmers Branch School, Dallas, Tex.
Alamo Heights Presbyterian Church, San Antonio,
Spring Branch Junior High School, Houston,
Shelburne School, Shelburne, Vt.
Central School, South Burlington, Vt.
Western State Hospital, Staunton, Va.
St. Michael's School, Annandale, Va.
Strasburg Fire Dept., Strasburg, Va.
U. S. Naval Air Station, Norfolk, Va.
Phi Delta Theta, Pullman, Wash.
Preston County Fire Dept., Kingwood, W. Va.
Beckley Hotel, Beckley, W. Va.
Elkins Junior High School, Elkins, W. Va.
Parkside Presbyterian Church, Madison, Wis.
St. Victors Congregation, Monroe, Wisc.
Janesville Girl Scouts, Janesville, Wisc.



Dickinson College, Carlisle, Pa.



Zembo Temple, Harrisburg, Pa.

available literature
assistance

Detailed specifications sheets available, as are samples of patterns and materials, colors, etc. Get the facts you need samples you require—Metwood is always happy to hear from

Representatives of the Metwood Mfg. Co. offer you their e enced aid in planning, selection and ordering—without oblig If special designs or variations are needed for special purposes tact us, freely.

metwood manufacturing co., inc.

exchange place • hanover, P

D-3/NaS

NATIONAL Line of Multi-purpose SCHOOL FURNITURE

... Featuring the exclusive

NATCOLITE TOP

Surfaced with

NEVAMAR®



This is NEVAMAR

- High-pressure laminate surface
- Resists heat, many uses
- Resists cigarette burns
- Withstands boiling water
- Won't stain, crack or peel in normal use
- Not affected by alcohol, hot coffee, ammonia, ordinary ink . . . or home cleaners
- Easy to clean

NATCOLITE TOP

National's No. S-330 FOLDING TABLE

Built for maximum strength and rigidity, easy handling and convenient stacking, these tables are simple to operate . . . can be quickly set up or taken down by one person. Seamless steel tubular legs lock automatically . . . can't fold accidentally. Made with perfectly balanced NEVAMAR-surfaced NATCOLITE tops for beauty and long life. (Also available with Masonite or plywood tops.)

National **SCHOOL FURNITURE COMPANY**

Division of National Store Fixture Co., Inc.

Odenton, Maryland



National

SCHOOL CHAIR

No. 2610 Series

Noted for its superior strength and durability, this chair is built of solid maple, steel corner blocks and electronically bent plywood for parts subject to greatest stress. Heights: 10 to 18 inches in 1-in. gradations. Seat size: 13-in. wide, 11½-in. deep for smallest, to 16½-in. wide, 14½-in. deep for largest. Honey Maple finish. No. 2710 Series — Same as No. 2610 but constructed of selected hardwoods.



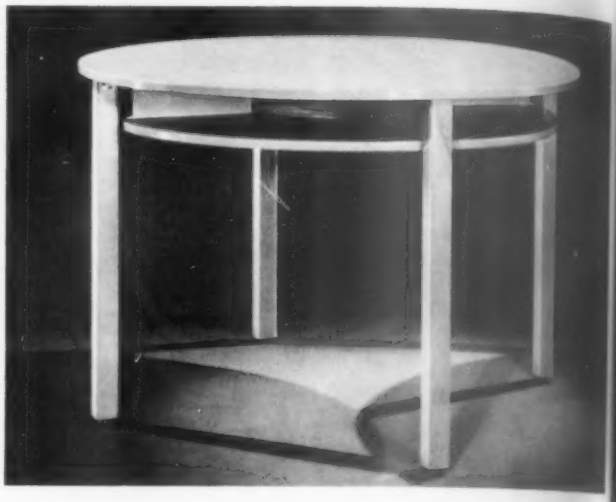
National

TABLET ARM CHAIR

No. 2800

Perfect unit for lecture rooms and study halls. Large NATCOLITE tablet arm is NEVAMAR-surfaced—never needs refinishing, provides genuine seating and writing comfort. Overall chair height: 33 inches. Seat size: 18¼-in. wide, 17-in. deep. 18 inches from floor. Tablet arm: 25½-in. deep, 15-in. wide, 13/16-in. thick. Honey Maple finish.

For Every School Need...



NATIONAL ROUND TABLE

No. 2320

Circular work and study table for kindergartens, libraries, classrooms and seminar rooms. Fully rounded compartmented bookshelf rigidly connected to table top. Has lasting NATCOLITE top. In Honey Maple finish. Standard top sizes: 36-in., 42-in. and 48-in. diameter. Heights: 20 to 30-in. and any 1-inch increment thereof.



NATIONAL ROMPER TABLE

No. 2335

Specially developed for lower grades, the trapezoidal design permits grouping in a variety of combinations. Easily moved about and quickly interchangeable. Built with graceful Formwood legs, it has a NATCOLITE top that won't stain—immune to acids, ink, paint. Never needs refinishing. Heights: 20 to 25 inches. Top size: 48x24x24x24 in.

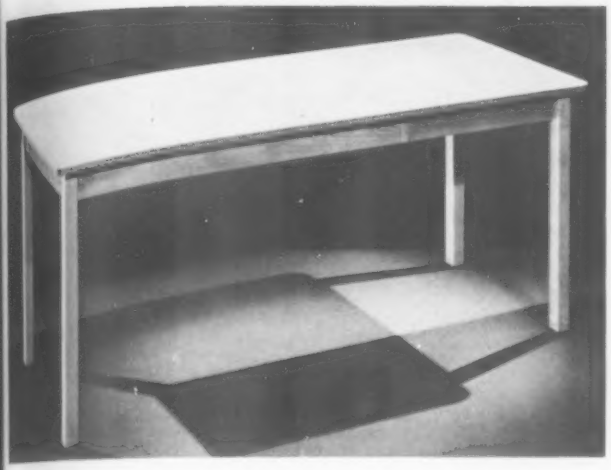


Round Romper Table No. 2325



Rectangular Romper Table No. 2336

The National Line of Multi-purpose School Furniture



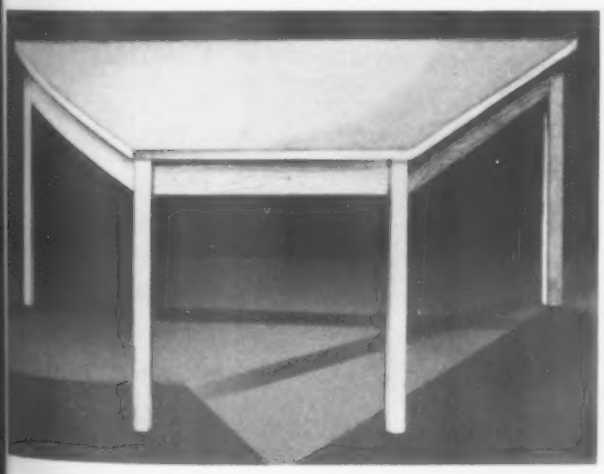
NATIONAL UTILITY TABLE
No. 2300

Suitable for every school use — in libraries, offices, cafeterias, classrooms. Exceptionally sturdy and made with the NATCOLITE top that never needs refinishing or resurfacing. Finished in Honey Maple. In 10 sizes from 24x24 inches to 36x96 inches. Available in 20 to 30-inch heights and any 1-inch increment thereof.



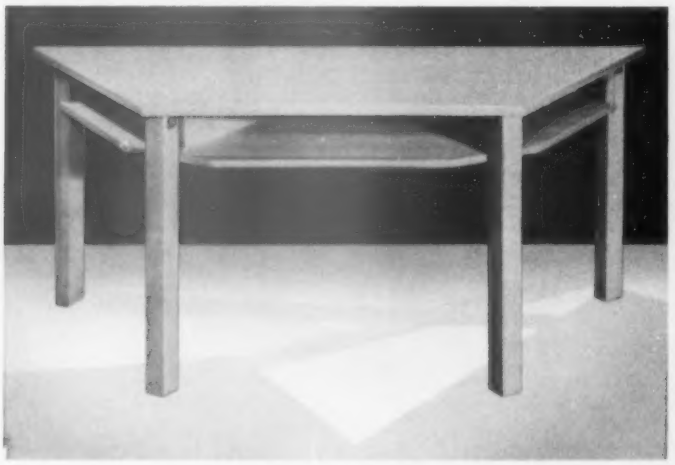
NATIONAL STUDY TABLE
No. 2310

Serves with equal distinction as a conference table, library table and general project table. No corner legs or parts to interfere with comfortable seating. Made with or without bookshelf on one or both sides. NATCOLITE top. Top sizes: 24x48-in., 30x60-in., 30x72-in., 36x72-in. Heights: 20, 23, 26 and 30 inches.



NATIONAL MULTI-MODE TABLE
No. 2330

Specially designed for group activity in multi-purpose classrooms, this trapezoidal table can be easily arranged in various groupings to meet every teaching situation. Has the NATCOLITE balanced-construction top that never needs refinishing. Top size: 60x30x30x30 inches. Heights: 20 to 30 inches and any 1-inch increment thereof.



MULTI-MODE BOOKSHELF TABLE
No. 2331

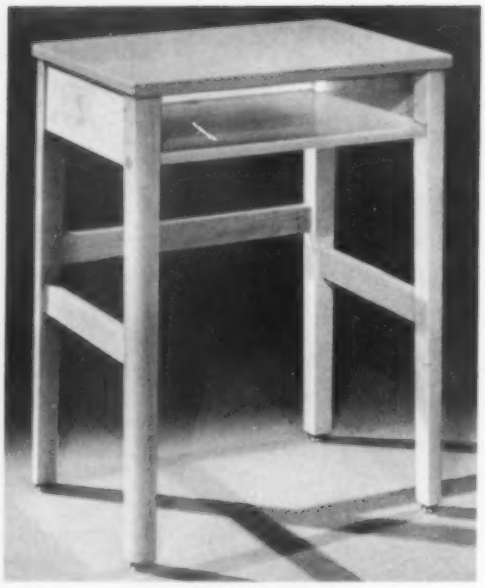
Combines the versatility of No. 2330 table with 5-position bookboxes, providing storage space on all four sides. Permits any grouping without sacrificing needed equipment space. Natcolite top. Simple K.D. assembly, yet rigid when assembled. Top size 60x30x30x30 inches. Heights: 20 to 30 inches and any 1-inch increment thereof.











National

SCHOOL DESK

No. 2220 Series

This movable desk features the NATCOLITE top, surfaced with NEVAMAR laminates in a wood-grain pattern specially developed for uniform low light reflectance. Never needs refinishing . . . eliminates maintenance problems. Banded with the Wynene shockproof edge — won't chip, dent or mar. Honey Maple finish. Heights: in 1-inch gradations from 20 to 30 inches. Top size: 18x24 inches.

This is
NEVAMAR

- a high-pressure laminate surface
- designed for long life and lasting beauty
- resistant to cigarette burns
- withstands boiling water
- won't craze, crack or peel in normal use
- not affected by alcohol, fruit acids, ammonia, ordinary ink . . . or time
- easy to clean

Guaranteed by Good Housekeeping

NATCOLITE TOP
NATIONAL STORE FIXTURE CO., INC.
ODENTON, MD.

For complete information, write for the new catalog of the National Line of Multi-purpose School Furniture.



NATCOLITE REPLACEMENT

DESK TOP

Surfaced with NEVAMAR *High Pressure Laminates*

Here is the solution to the maintenance problem of school desks and tables. A full replacement top program is actually more economical than the constant resurfacing of old, battered wooden tops. The NATCOLITE top is a completely fabricated unit with a NEVAMAR surface that makes it completely sanitary and virtually mar-proof. A specially developed wood-grain pattern assures uniform low light reflectance. And a damp cloth is all that is needed to keep these tops like new. With NATCOLITE tops, refinishing and resurfacing is ended forever. A replacement program can be accomplished quickly and easily without any interruption of regular schedules.

National **SCHOOL FURNITURE COMPANY**

Division of National Store Fixture Co., Inc.

Odenton, Maryland



D-3/sh

ANNOUNCING

The Classroom Furniture of Tomorrow . . . **TODAY**

Samsonite





a new concept in color...

a new dimension in design



The Mobile Samsonite Open Front Desk gives maximum storage space! Forms related unit with matching Pivot-Back chair.

The bright magic of

Russel Wright

...only with Samsonite Classroom Furniture



New sun-bright colors make drab Classrooms Cheerful

This new classroom furniture makes attention less tiring, learning more fun!

Samsonite combines creative imagination with scientific analysis and survey testing in 30 states...creates the most modern classroom furniture in the world!



290 square inches of writing surface! New Samsonite *Tablet Desk Chair* plays multiple roles in classroom, meeting rooms, lunchroom.

IN COMFORT...

all dimensions and contours embody gently flowing lines in back and seats, to promote proper posture, and insure maximum classroom attention. Desk and chair combinations come in *nine* posture-perfect sizes for every grade and for every school.

IN MOBILITY...

Samsonite's modern design allows the instructor to create exciting informal layouts or conventional rectilinear arrangements... move units from room to room without conflict in color or contour.

IN DURABILITY...

new features like aluminum spats on legs, evidence Samsonite's insistence on furniture that's "strongest ...lasts longest"...maximum economy for burdened school budgets.

A new note in schoolroom furniture, Samsonite's *Circular Table* lends an informal, non-institutional look to the classroom.



Samsonite's four colors were carefully selected to blend or contrast effectively with classroom colors nationally in use... to mix-match harmoniously among themselves, in pairs, or in other combinations. Look at the bright possibilities the new selection gives you.

D-3/sh

GREY

A new, sparkling Grey tone blends with every color scheme.

BROWN

A new "freshened" Brown avoids usual drabness of that color.

TURQUOISE

A friendly Green-Blue introduces exciting classroom color interest.

TERRA COTTA

A lively yet subdued Red, refreshing in any room.

New comfort-curved contours keep young bodies healthy



For all group activities, Samsonite's colorful *Activity Table* with three book boxes. (Also available with six boxes.)



Newness of line, brilliance of color, keynote Samsonite's new *Teacher's Desk*. Maximum work and storage space!



Samsonite *Lift-Lid Desk*. Fingers cannot be caught between lid and book box because of special "recessing". Friction hinge prevents slamming!



New Samsonite *Trapezoid Table* adapts in groups to endless combinations for varied school activities.



New rolling contours in Samsonite's *Unit Chair!* Available with Samsonite's new *swivel back*.

Back swivels to cradle every body movement!



Samsonite *Student Desk* can also serve as table. Several can be pushed together for group projects.

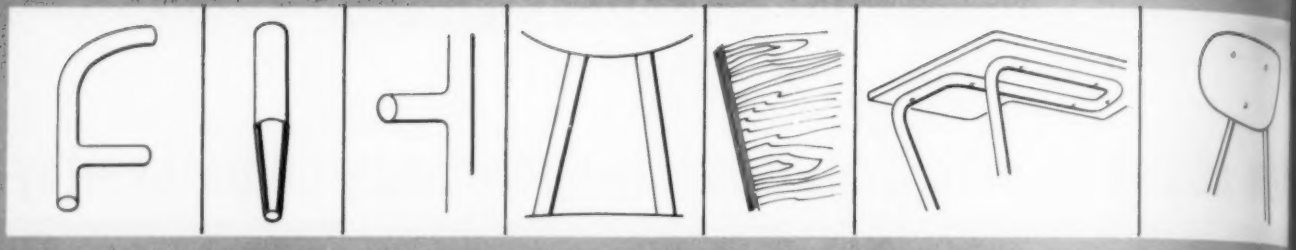


Plenty of leg room and storage space! The Samsonite *Shelf Desk* brings modern color, graceful lines to the classroom.

Why Samsonite is your smartest school buy

New construction advances for a bright new age in classrooms

MONEY SAVING DURABILITY



Tubular steel frame construction to combine lightweight mobility with extreme strength.

Roller-swaged leg taper. Thicker tubing at bottom gives extra durability and support. Tapers encased in aluminum spats.

Resistance welded joints. Metal joints made in specially designed machines. Welds are as strong as frame itself.

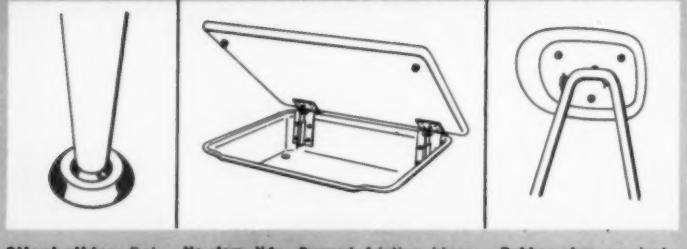
Electrostatically-deposited enamel on bonderized metal. Absolutely uniform enamel coverage. Non-chalking, highly resistant to abrasion and chipping.

Best quality adhesives. Wooden joints are bonded with water resistant urea resin adhesives, cured under heat and pressure.

Perfectly balanced supports. Tablet arms and tablet desk supports are made of continuous lengths of steel. Cantilever distributes all stresses evenly.

Plastic back support. [illegible] needs refinishing. [illegible] reinforcement plate [illegible] sures perfect distribution of stresses.

FULL CLASSROOM SILENCE

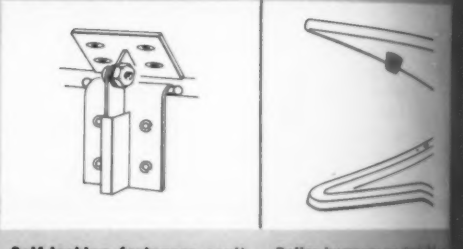


Silent glides. Polished steel glides cushioned in rubber eliminate distracting noise from moving furniture.

No-slam lids. Rugged friction hinges prevent slamming. Countersunk rubber grommets eliminate all possibility of noise.

Rubber stop on pivoting back guarantees completely silent pivot operation.

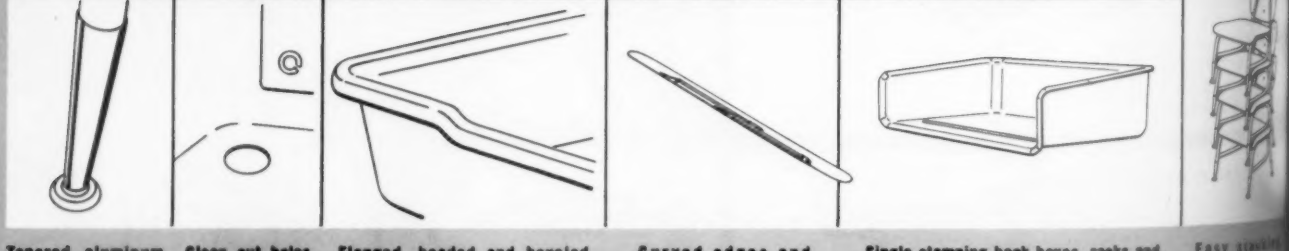
MISCHIEF PROOF



Self-locking fasteners can't be loosened with coins, knives or even screwdrivers.

Roller bumpers on desk lid are countersunk, cannot be pried loose.

EASY, TIME-SAVING MAINTENANCE



Tapered aluminum spats camouflage scuffs and mop-marks.

Clean out holes in desks and book boxes prevent dust accumulation, save time in cleaning.

Flanged, beaded and beveled corners and edges simplify cleaning, eliminate dust accumulation.

Curved edges and grooves on pencil trays for thorough cleaning in a jiffy.

Single stamping book boxes, racks and shelves. No seams, joints or rough edges to collect dust or hamper cleaning.

Easy stacking. Shape of [illegible] legs compatible with shape [illegible] of seats. Chairs may be [illegible] securely four high.

Makers of the famous Samsonite folding tables and chairs for every institutional use

New Samsonite Classroom Furniture Catalogue

Complete specifications on new Samsonite Classroom Furniture fully illustrated in color. Write to Shwayder Bros., Classroom Furniture Division, Detroit 29, Mich. for a copy and for the name of your nearest distributor.

Samsonite ...the Classroom Furniture that's

STRONGEST...LASTS LONGEST!

D-3/To

modern, long-lasting

SCHOOL FURNITURE

chairs • desks • tables • stools

FOR CLASSROOMS, LABORATORIES, COMMERCIAL AND MANUAL TRAINING DEPARTMENTS

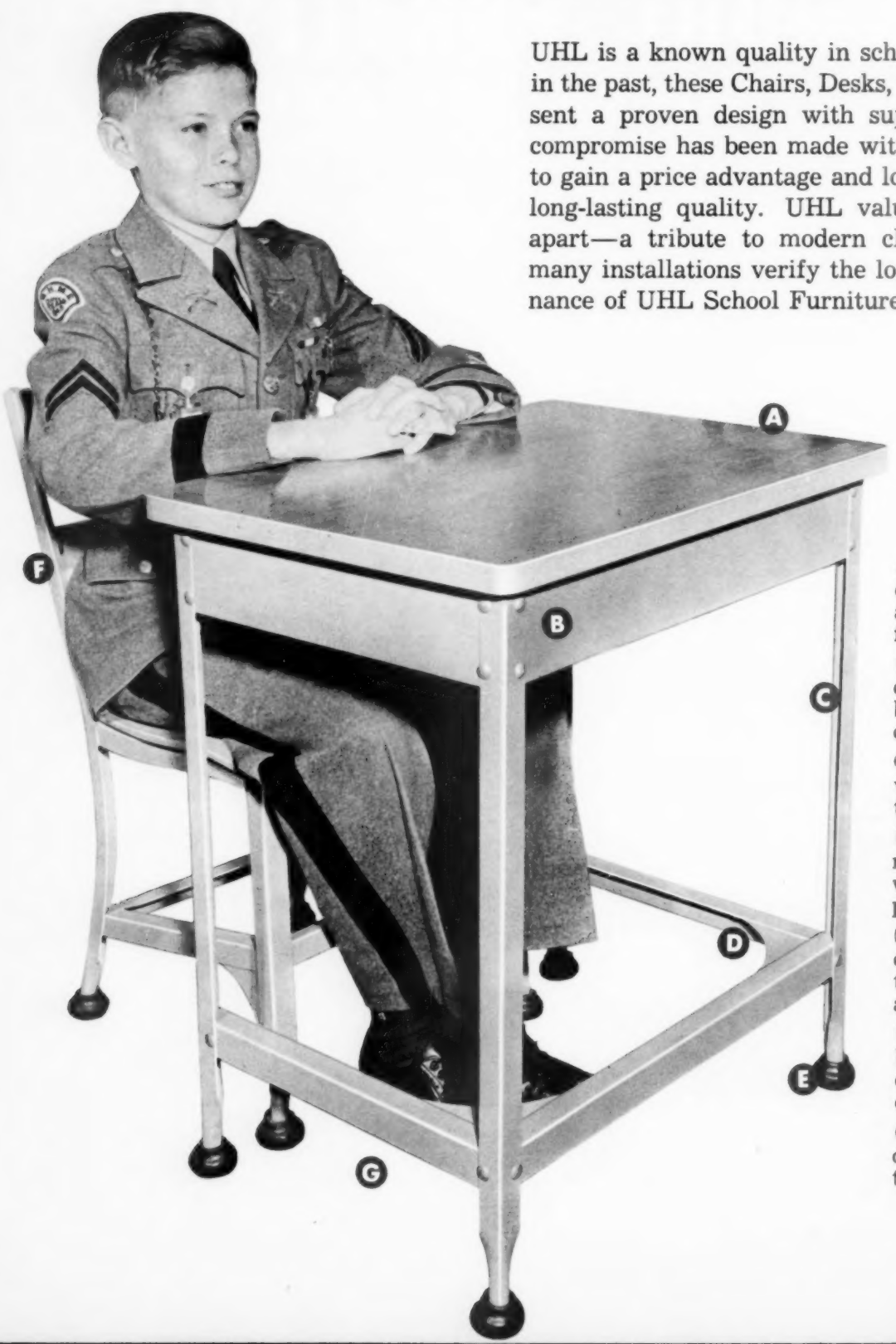


The Toledo Metal Furniture Company

TOLEDO

. . . A HALF-CENTURY OF QUALITY KNOWN TO LEADING SCHOOLS AND UNIVERSITIES IN THE U.S.

UHL is a known quality in school furniture. Today in the past, these Chairs, Desks, Tables, and Stools rep sent a proven design with superior construction. compromise has been made with methods, or mater to gain a price advantage and lose the UHL prestige long-lasting quality. UHL value remains distinct apart—a tribute to modern classroom facilities. many installations verify the long life and easy mai nance of UHL School Furniture.



A Natural birch ply or plastic writing surf available in standard finishes.

B Cold rolled steel construction—welded p bolted components for of assembly.

C All steel parts fo with smooth, rounded ty edges.

D Steel corner rei ments are electric welded permanently place—add years to

E A choice of feet or designed for proper tion and maximum ser ability.

F Posture-formed se back provides max comfort and increases dent efficiency.

G Choice of attra durable finishes that the modern school

You can't beat UHL long



many outstanding advantages of UHL School Desks and the great flexibility in modern classroom use. Groupings and angements can be changed readily for varying numbers of to increase classroom efficiency. Model 60-D Desks and Chairs are illustrated (see pages 4 and 5).



University laboratory classroom equipped with UHL Quick-Adjusting Posture Chairs to provide the maximum of comfort for students. Model 7206-17 is equipped with ball and socket, swivel-type, feet for ease of movement and for floor protection, with minimum noise (see page 6).



classroom equipped with Model 9000-18-TA UHL Tablet (see page 5). The neatness of the all-steel chair base and natural birch plywood, posture-formed seats and backs enppearance of any modern classroom setting. Chairs equipped glide" all-rubber tips.



A university electronics laboratory equipped with UHL Chairs and Stools. Model 9000-18 Chairs are used with the UHL Model 8100 Classroom Table in the foreground, and stools with backrests are arranged along laboratory equipment benches.



classroom in a modern high school. UHL Quick-ture Chairs, Model 9606-17 with rubber casters, provide mfortable seating at UHL Special Type Tables designed lar use.



A school cafeteria equipped with UHL Model 7100 Tables (see page 8) and Model 9000-WS-18 Chairs (see page 5). UHL Tables and Chairs blend well with modern cafeteria arrangement and appearance—give long-lasting economy of use.

ong Quality at any Price . . .



MODEL NO. 30-C



MODEL NO. 30-D

ONE AND TWO-PUPIL DESKS AND MATCHING CHAIRS

A range of sizes from kindergarten through senior high school and college.

Desks available in three styles: plain, with compartments, or with drawers.

UHL Desks and Chairs are available in sizes and finishes for any school need.

FEATURES	DESCRIPTION	MODEL NO. 30 (Plain)	MODEL NO. 30-C (Compartment)	MODEL NO. 30-D (Drawer)	MODEL NO. 60 (Plain)	MODEL NO. 60-C (Compartment)	
TOPS: Wood	High-grade birch plywood, water-resistant. **Finish:** Natural birch or stained: school brown, green, walnut, or gray.	SIZE: 18" x 24" x ¾"			SIZE: 20" x 40" x ¾"		
Plastic	Simulated natural wood-grained finish. Meets N.E.M.A. specifications.						
BASE	All steel bolted construction, with component parts welded. Safety rounded edges. **Finish:** Beige, brown, gray, or green.	HEIGHTS: 20" to 30". See "Schedule of Sizes" below.			HEIGHTS: 20" to 30". See "Schedule of Sizes" below.		
FEET	Dome-shaped steel feet.	OPTIONAL: "Pussyfoot" all-rubber tips—resist movement—protect floor. "Pussyfoot" steel-faced glides available upon request.					
COMPARTMENT			One 16"x22"x3½"			Two, each 18"x23"x3½"	
DRAWERS	Engineered to operate easily and smoothly.			One 15"x12"x2¾"			Two 15"x
PACKING	Knocked-down in individual cartons. Easily and quickly assembled.						
SHIPPING WEIGHT		20 lbs.	23 lbs.	23 lbs.	40 lbs.	46 lbs.	



MODEL NO. 60-C

SCHEDULE OF DESK AND CHAIR SIZES—KINDERGARTEN THROUGH COLLEGE

Chairs (Height of seat)	10"	11"	12"	13"	14"	15"	16"	17"
Desks (Height)	20"	21"	22"	23"	25"	26"	27"	29"
Kindergarten	5%	40%	55%					
1st Grade		10%	70%	20%				
2nd Grade			40%	40%	20%			
3rd Grade				30%	60%	10%		
4th Grade					60%	30%	10%	
5th Grade					20%	60%	20%	
6th Grade						40%	50%	10%
7th Grade						10%	60%	30%
8th Grade							20%	50%
Jr. High School								5%
Sr. High School & College								

THE RESPONSIBILITY IS YOURS TO LECT THE MOST VALUE FOR YOUR CHOOL EQUIPMENT DOLLAR . . . SELECT HL CHAIRS AND DESKS

is combination is designed to meet the needs of many ting arrangements in classrooms (see cover and e 3 for typical illustrations). UHL equipment pro- les the flexibility essential for use with varying m sizes, and class sizes. Maintenance personnel pre- UHL styling and service qualities, too! The complete e of modern, long-lasting UHL classroom equipment he best choice for school and university.

The Toledo Metal Furniture Company



MODEL NO. 8014

		SERIES 8000—MODEL NOS.						SERIES 9000—MODEL NOS.											
		Wood Seat & Back					Wood Seat & Back			Steel Seat & Back			Wood Seat & Steel Back			Wood Seat & Back		
TYPES	DESCRIPTION	8010	8011	8012	8013	8014	8015	9000-16	9000-17	9000-18	9000-S-16	9000-S-17	9000-S-18	9000-WS-16	9000-WS-17	9000-WS-18	9000-TA-16	9000-TA-17	9000-TA-18
Steel	**All Steel:** Welded construction. Gusseted for strength. **Finish:** Beige, brown, gray, or green.																		
Wood	**Birch Veneer:** Posture-formed. **Finish:** Natural birch or stained: green, school brown, walnut, or gray.	Ht. 10"	Ht. 11"	Ht. 12"	Ht. 13"	Ht. 14"	Ht. 15"	Ht. 16"	Ht. 17"	Ht. 18"				Ht. 16"	Ht. 17"	Ht. 18"	Ht. 16"	Ht. 17"	Ht. 18"
Steel	**All Steel:** Posture-formed and perforated. **Finish:** Beige, brown, gray, or green.										Ht. 16"	Ht. 17"	Ht. 18"						
Wood Top	**Birch Veneer:** Posture-formed. **Finish:** Natural birch or stained: green, school brown, walnut, or gray.																		
Steel	**All Steel:** Posture-formed. **Finish:** Beige, brown, gray, or green.																		
	Birch Veneer: Size: 24" long, 12" wide writing surface. Quickly and easily assembled.																Yes	Yes	Yes
		Rubber Cushioned Steel Feet.						Dome Shaped Steel Feet. OPTIONAL: "Pussyfoot" steel-faced glides. "Pussyfoot" all-rubber tips.												
	Set up two to a carton.																Arm packed ready for assembly.		
		6 lbs.	6 lbs.	6 lbs.	7 lbs.	7 lbs.	7 lbs.	13 lbs.	13 lbs.	13 lbs.	14 lbs.	14 lbs.	14 lbs.	14 lbs.	14 lbs.	14 lbs.	18 lbs.	18 lbs.	18 lbs.

NOTE: Series 9000 Chairs available in seat heights up to 30-in. for special applications.



MODEL NO. 9000-18



MODEL NO. 9000-S-18



MODEL NO. 9000-TA-18

STEEL BOOKRACK (Optional Equipment)



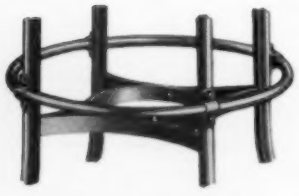
TOLEDO LABORATORY STOOLS



MODEL NO. 146-C



All steel welded backrest can be furnished on all stools at slight additional cost.



Footrest ring can be furnished on all stools 28 in. high and over, at additional cost. Furnished standard on some No. 626 models. See table.

Designed and constructed to give many years service with virtually no maintenance expense. Maximum strength, minimum weight. Many models and sizes adaptable to all purposes.



MODEL NO. 626-C

FEATURES	DESCRIPTION	MODEL 146-S	MODEL 146-C	MODEL 626-S
FRAME	All steel construction. **Finish:** Beige, brown, gray, or green.			
SEAT — Steel	Perforated steel— **Finish:** To match frame.	14 in. dia. stationary		14 in. dia. swivel
SEAT — Wood	Solid wood seat—		15 in. dia. stationary	
MINIMUM HEIGHTS		16 in. to 34 in.— 2 in. steps	17 in. to 35 in.— 2 in. steps	25 in. to 33 in.— 2 in. steps
ADJUSTMENT		None	None	Easy, positive adjustment, wood to metal friction, 8 heights.
FEET	Dome-shaped steel.	Dome-shaped steel. OPTIONAL: "Pussyfoot" all-rubber tips. "Pussyfoot" steel-faced glides.		Ball and socket OPTIONAL: Hard-rubber bearing cups, wide tread.
FOOTREST RING	Steel.	OPTIONAL: Models 28 in. and over.		Standard on Models 28 in. and 33 in.
BACKREST		Steel—bolted to seat rim. Furnished at slight additional cost.		Furnished or adjustable or non-adjustable steel back additional cost.
PACKING		Set up		Set up
SHIPPING WEIGHTS		10 lbs. to 14 lbs.		17 lbs. to 19 lbs.

UHL laboratory stools, posture chairs, [illegible] writer tables have been a popular [illegible] leading schools and universities throughout country for many years. Repeat orders [illegible] panded school facilities are the best [illegible] of satisfactory service. If you want to [illegible] of dollar value—specify and buy UHL [illegible] ment.

Quick, Adjustable POSTURE CHAIR

A most popular posture chair for stenographers, clerks, laboratory technicians and commercial students. Correct and comfortable seating. Quick, easy adjustment. Rigid construction assures long-lasting, trouble-free service.



MODEL NO. 9606-17

FEATURES	DESCRIPTION	MODEL NOS. 9606 -17	9608 -19	9609 -22	965 -5
FRAME	All steel formed: Rounded safety edges. **Finish:** Beige, brown, gray, or green.				
SEAT	**Birch Veneer:** Posture formed—swivel type. **Finish:** Natural or stained: gray, green, or walnut.				
BACKREST	**Birch Veneer:** Self-conforming, adjustable up or down—2½ inches. **Finish:** Natural or stained: gray, green, or walnut.				
HEIGHT ADJUSTMENT	Easy, positive adjustment.	4½ in. in ½ in. steps.			
Minimum		17 in.	19 in.	22 in.	25 in.
Maximum		21½ in.	23½ in.	26½ in.	29½ in.
FOOT REST					STANDARD EQUIPMENT
CASTERS	2 in. hard rubber wheel ball bearing swivel-type — 1 in. wide tread.				
OPTIONAL EQUIPMENT	Removable foam rubber upholstery.				
PACKING	Set up—two to a carton.				
SHIPPING WEIGHT		20 lbs.	22 lbs.	23 lbs.	26 lbs.

TOLEDO BUSINESS MACHINE STANDS

DESCRIPTION	671	671-X	7800	7800-X
Heavy-gauge cold-rolled steel—"U" construction—rounded safety edges. **Finish:** Baked enamel—beige, brown, gray, or green.				
Birch Veneer. Solid gray, natural birch, or stained: green or walnut.	14 in. x 17½ in.		17 in. x 24 in.	
26 in.				
Lever transfers weight from casters to solid feet and vice-versa. Fingertip control.				
Can be mounted flush with top or in raised position. Shelves are interchangeable from left to right side. One or two shelves may be used for either 671 or 7800 series.	12 in. x 14 in.		12 in. x 17 in.	
2-in. hard rubber, with 1-in. wide, soft treads. Quiet, easy rolling.				
Set up in individual cartons. Shelves packed with stands as ordered.				
STAND	16 lbs.	21 lbs.	22 lbs.	28 lbs.
SHELVES—1	3 lbs.	3 lbs.	4 lbs.	4 lbs.
2	6 lbs.	6 lbs.	8 lbs.	8 lbs.



MODEL NO. 671-X
ONE SHELF

MODEL NO. 7800
TWO SHELVES

UHL Business Machine Stands are a symbol of economy and efficiency for classroom or office use. Both movable and stationary types are offered with a variety of outstanding and exclusive features.

The models illustrated are quality constructed of heavy-gauge metals, assuring long-lasting service. A complete range in size and style permits a choice for every school need.

	MODEL NOS.					
DESCRIPTION	8918	8918P	8925	8925P	8925D	8925PD
All steel formed-rounded safety edges—welded and bolted. **Finish:** Beige, brown, gray, or green.						
26 inches or 30 inches.						
All steel with rounded safety edges.	SIZE: 16 in. x 18 in.		SIZE: 16 in. x 25 in.			
Holds supplies for immediate typing needs.					SIZE: 9¼ in. x 13¼ in. x 1 in.	
	Dome Shaped Steel	2 in. Rubber Casters	Dome Shaped Steel	2 in. Rubber Casters	Dome Shaped Steel	2 in. Rubber Casters
"Pussyfoot" all-rubber tips.						
Knocked-down in individual cartons. Easily and quickly assembled.						
	16 lbs.	17 lbs.	18 lbs.	19 lbs.	20 lbs.	21 lbs.



MODEL NO. 8918-P

	MODEL NOS.			
DESCRIPTION	8931	8931P	8931D	8931PD
All steel formed—rounded safety edges — welded and bolted. **Finish:** Beige, brown, gray, or green.				
26 inches or 30 inches.				
All steel with rounded safety edges.	SIZE: 16 in. x 31 in.			
Holds supplies for immediate typing needs.			SIZE: 9¼ in. x 13¼ in. x 1 in.	
	Dome Shaped Steel	2 in. Rubber Casters	Dome Shaped Steel	2 in. Rubber Casters
"Pussyfoot" all-rubber tips.				
Knocked-down in individual cartons. Easily and quickly assembled.				
	20 lbs.	20 lbs.	22 lbs.	23 lbs.



MODEL NO. 8931-D

The Toledo Metal Furniture Company

TOLEDO

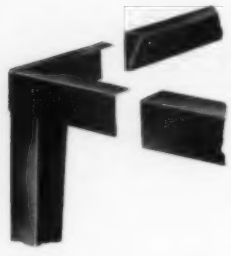
Tables for general and cafeteria use

Long-lasting, easily maintained, work and cafeteria tables. Unique steel construction provides strong framework with modern styling—sanitary, too! A choice of top finishes available to match motif.

Model No. 8100 of similar appearance may be furnished with wide apron to include one or two drawers.



MODEL NO. 7100



Gives More Dollar Value!

Apron and base construction of Model 7100 Table. Anchor plate in side rail, combined with wedge action of screw into upper corner, makes assembly tight, and construction rigid.

FEATURES	DESCRIPTION	MODEL NO. 7100
BASE Legs	All steel formed—welded and bolted. Square tapered: Top—2½ in. Bottom—1¾ in. with aluminum caps and collars. **Finish:** Beige, brown, gray, or green.	
TOPS	15/16 in. thick. Water-resistant plywood core. Edges—Extruded aluminum "T" type banding. Corners rounded—1 in. radius.	Can be covered with a choice of such as linoleum, masonite, Formica, in a variety of colors and patterns. **Note:** 1¼ in. tops can be made to request.
SIZES—		30 x 30 | 36 x 36 | 30 x 48 | 36 x 48 OVERALL HEIGHT: 29½ in. APRON: 3½ in.
PACKED	Knocked-down.	
SHIPPING WEIGHT		75 lbs. | 85 lbs. | 95 lbs. | 120 lbs.

Note: Other table sizes available on special order.

FEATURES	DESCRIPTION	MODEL NO. 8100
BASE Legs	All steel formed—welded and bolted. Square tapered: Top—2½ in. Bottom—1¾ in. with aluminum caps and collars. **Finish:** Beige, brown, gray, or green.	
TOPS	15/16 in. thick. Water-resistant plywood core. Edges—Extruded aluminum "T" type banding. Corners rounded—1 in. radius.	Can be covered with a choice of such as linoleum, masonite, Formica, in a variety of colors and patterns. **Note:** 1¼ in. tops can be made to request.
SIZES—TOPS		30 x 48 | 30 x 60 | 36 x 48 OVERALL HEIGHT: 29½ in. APRON: 5 in.
DRAWERS	SIZE: 20 in. wide x 22 in. deep x 2¾ in. high.	No Drawer or One Drawer | No Drawer—One or Two Drawers
PACKED	Knocked-down.	
SHIPPING WEIGHT		115 lbs. | 140 lbs. | 150 lbs. Add 15 lbs. to above weights for one drawer

Note: Other table sizes available on special order.

OUR GUARANTEE OF SATISFACTION . . .

UHL offers a guarantee of customer satisfaction backed by a half century of proven product design and a pride in workmanship. UHL furniture is thoroughly dependable . . . offered as the outstanding value for long life and ease of maintenance.

The Toledo Metal Furniture Company

936 SOUTH HASTINGS STREET • TOLEDO 7, OHIO, U.S.A.

FORM NO. 809

D-3/VI

"...sroom-tested" for today's thinker!



VIRCO MANUFACTURING CORPORATION

"makers of America's finest school desks, chairs and tables"

1955 catalog

design

manufacturing

Virco "Classroom-Tested" school furniture is designed with features that are absolute "musts" in assisting the student at work.

Virco school furniture is strong.
Virco school furniture is safe.
Virco school furniture is mobile.
Virco school furniture is modern in design.
Virco school furniture is functional.

Vircolite Plastic "Tops of Quality" are easy to maintain because they are impervious to wear and moisture, are stain and mar-resistant and never need to be refinished. Specify Vircolite and save maintenance costs.



Virco now has two modern, fully equipped manufacturing plants, operating to produce America's finest school chairs, desks and tables. These two plants are complete units, comprised of skilled workmen in each department, using only the finest materials and modern machinery.

VIRCO'S two plants to serve you.

On the west coast VIRCO Mfg. Corp., is in Los Angeles, Calif.

To better serve the south and the midwest, VIRCO'S newest plant is at Conway, Arkansas.





VIRCO

#100 series



#100 SERIES	
Seat Height	Pad
18"	
17"	
16"	
15"	
14"	
13"	
12"	
11"	



#800 SERIES	
Seat Height	Pad
18"	
17"	
16"	
15"	
14"	
13"	
12"	
11"	

VIRCO

#800 series

classroom side chairs in 8 graded sizes

#100 Series

Made of tubular steel and solid Maple, this chair is built for resistance -- to wear, to warping, to scratching and tearing hazards, to stain by cleaning and disinfecting agents, to extreme changes in temperature. Streamlined in construction and appearance, it combines unusual durability with unusual comfort.

When ordering Virco Chairs specify style number to insure correct delivery.

#800 Series

Made of tubular steel frame, contoured seat and back of 5 ply hardwood, with birch ply faces on top and bottom. This new #800 series chair is designed for comfort and efficiency and is resistant to wear, warping, to changes in temperature and is mar and stain resistant.

Its streamline design and construction combine to give unusual durability, plus, unusual comfort.

Ideal for modest budgets.

classroom side chairs in 8 graded sizes

... a loss of sentiment-



... but a gain in durability!

Vircolite Plastic "Tops of Quality"

Made by the durable VIRCO process, Vircolite Plastic "Tops of Quality" for school desks and tables is more and more in demand by school administrators. Vircolite is the answer for low maintenance costs - Vircolite is impervious to wear and moisture - never needs to be refinished and will stand up under years of use and abuse.

Even ball-point pens can't hurt Vircolite and it's stain-resistant, too.

Best of all, Vircolite Plastic "Tops of Quality" cost no more than conventional hardwood.

Specify Vircolite and eliminate repairs, refinishing and replacement.

VIRCO chair desks #108



#108

Designed for writing comfort without vibration. All-tubular steel base with crescent bracing provides maximum rigidity. Saddle seat and curved back encourage correct posture. Note the simple yet very sturdy supporting mechanism for the extension arm.

#137 Tablet Arm -- Same as above except that it has a tubular steel book shelf in place of the crescent bracing under seat.

Chair height: 18" Tablet arm size: 12" x 24"
Shipping Weight: 22 lbs.

RECOMMENDED IN VIRCOLITE

VIRCO chair desks #300 series

featuring Vircolite Plastic "Tops of Quality



#300 Series

At last a chair desk that won't tip over frontward when someone touches it! This good looking, sturdy chair desk has all the features of a more expensive unit, such as plastic working surface, ample book storage under seat and full frame support to prevent tipping.

The only moderately priced chair desk featuring Vircolite at no additional cost.

	13" Size	15" Size	17" Size
Height of Seat	13"	15"	17"
Height of Desk	21½"	23½"	27½"
Desk Top Width	18"	22"	22"
Desk Top Length	13"	17"	17"
Between Seat and Desk (Clearance)	7¾"	8¾"	9½"
Between Back and Desk (Clearance)	10¼"	12"	13"
Width (Over-all)	18"	22"	22"
Depth (Over-all)	25"	28½"	31"
Height (Over-all)	23½"	28"	31"
Packed Weight	30 lbs.	33 lbs.	35 lbs.

VIRCO chair desk #110

D-3/VI



#110

The ultimate in streamlined efficiency for the modern classroom is embodied in this movable Chair Desk. From its saddle-scooped seat to its extra-wide "posture-perfect" sloping top to its steel book compartment -- student needs and comfort have dictated the design. No matter how rough the treatment, Virco Chair Desks will maintain their attractive appearance and solid strength through the years. Ample work surface -- 17" x 23" -- engineered for proper light reflectivity. Steel book-rack permanently welded to frame. Available with Vircolite plastic desk top.

Height of Seat	17"
Height of Desk	26¼"
Desk Top Width	23"
Desk Top Length	17"
Between Seat and Desk (Clearance)	9"
Between Back and Desk (Clearance)	13"
Width (Over-all)	25"
Depth (Over-all)	32½"
Height (Over-all)	32¼"
Packed Weight	35 lbs.

RECOMMENDED IN

IRCOLITE

TOPS OF QUALITY

tables .....

The complete range of styles, sizes and typ
of VIRCO tables for classroom or ban
room, have made this line most popular
The famous VIRCO "400" and "600" se
of classroom tables, for individuals
groups, the #724 Open Front Desk and
companion #729 Lift-Lid Desk and
VIRCO Folding Leg Banquet Table are
favorites of long standing.

Recently added to this group of distin
guished VIRCO Tables is the #658A Typ
Table with the adjustable leg and the
#3000 Student Activity Table.

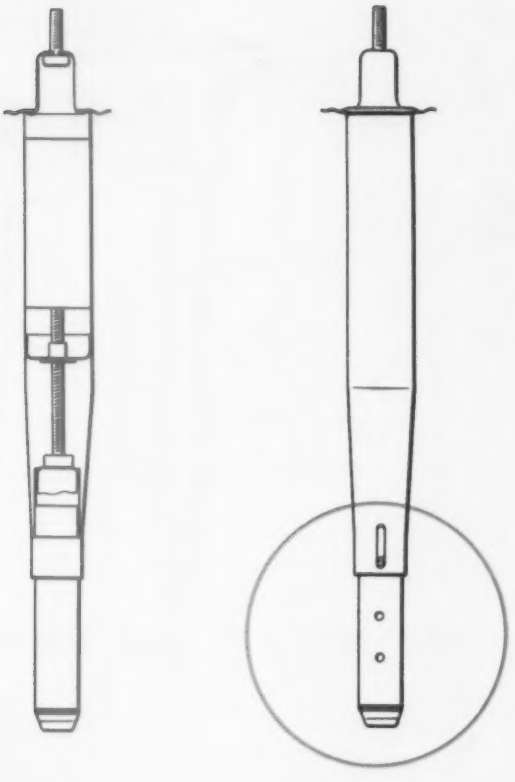
Top quality materials, fine design and
satility have proven the adaptability
these VIRCO tables in many school uses

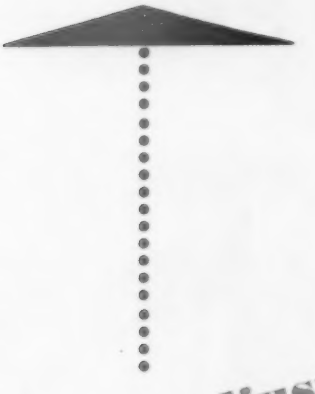
VIRCO's #400 series, Classroom Tables, with their exclusive *"micrometer adjustment"* in three graded heights, have received unanimous acceptance in schools everywhere.

These tables are superior in every respect, in strength, appearance, utility and in the new, exclusive *"micrometer adjustment"* by VIRCO.

Each leg can be adjusted, individually, within a three inch range. This is especially important in schools built with slab floors and the uneveness of these slab floors can be compensated for by a simple turn of the *"micrometer adjustment."*

These tables are available without the adjustment mechanism, if desired.



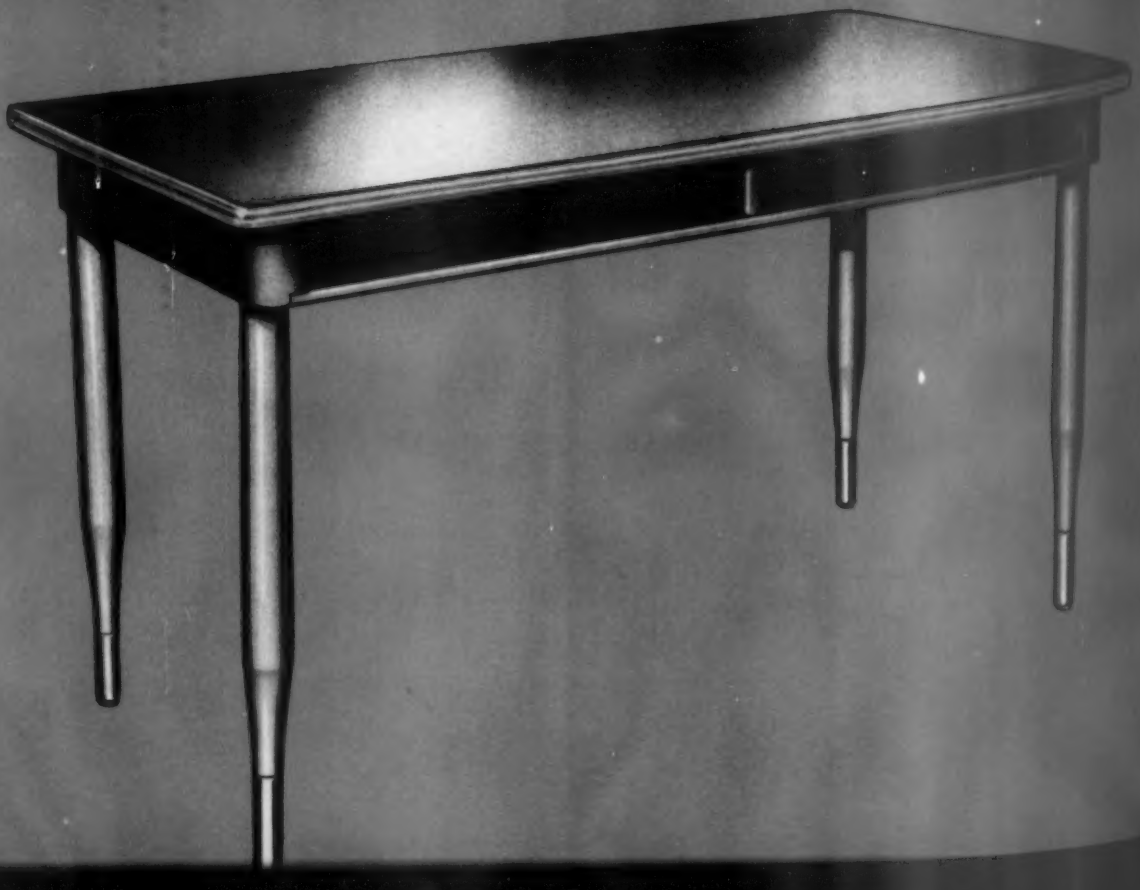


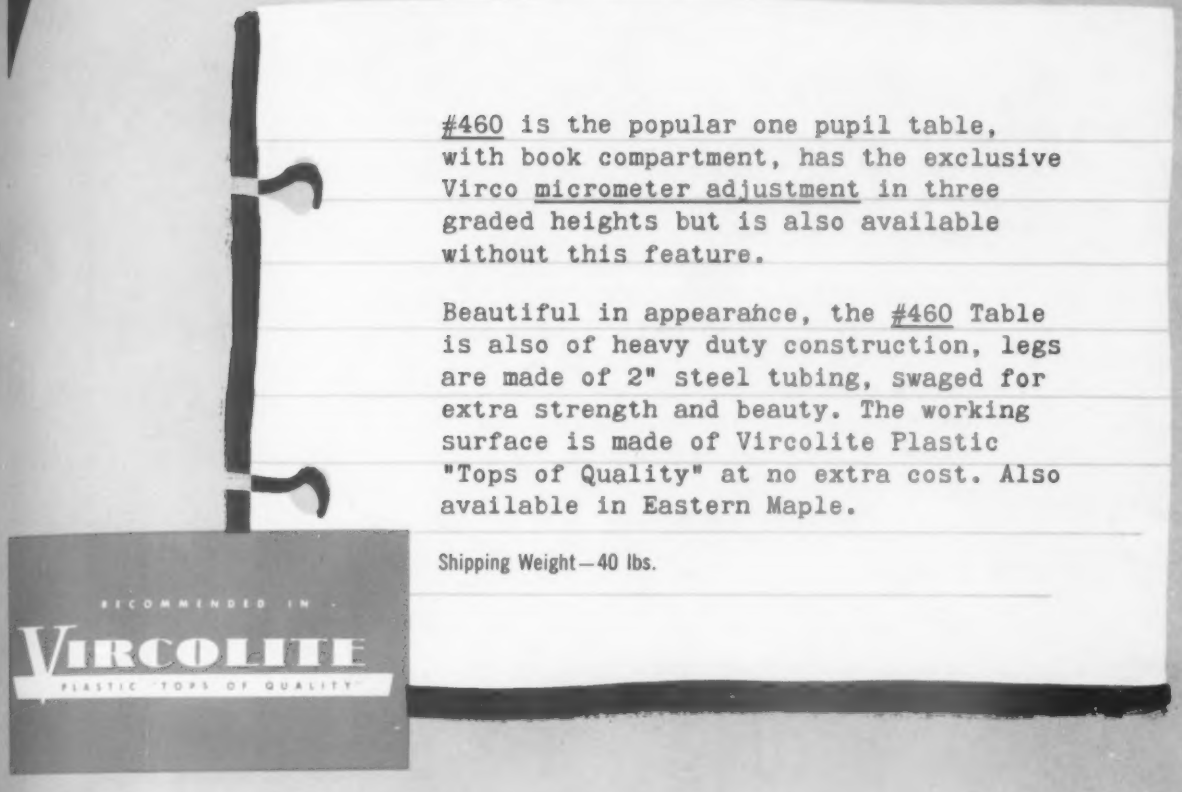
"micrometer adjustment"

VIRCO one-pupil table #460



VIRCO two-pupil table #464

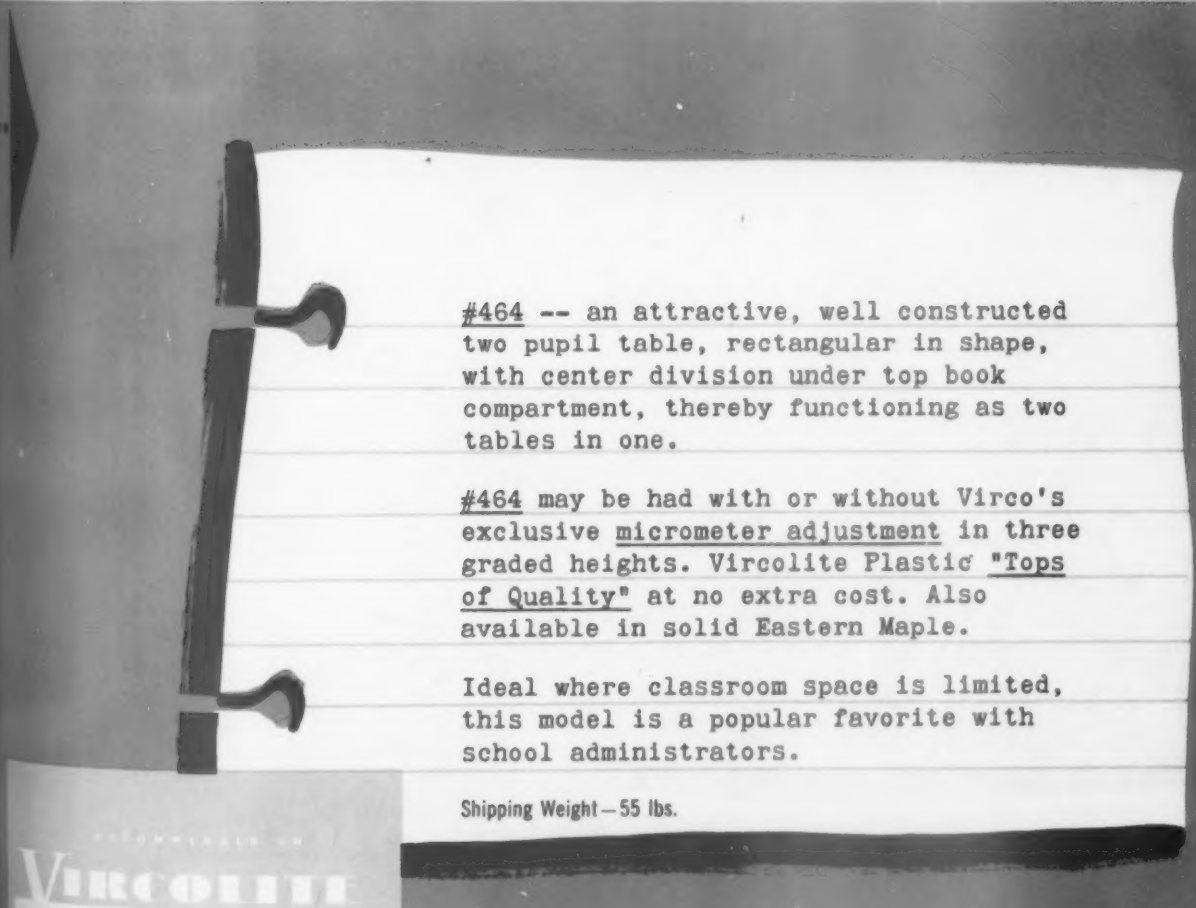




#460 is the popular one pupil table, with book compartment, has the exclusive Virco micrometer adjustment in three graded heights but is also available without this feature.

Beautiful in appearance, the #460 Table is also of heavy duty construction, legs are made of 2" steel tubing, swaged for extra strength and beauty. The working surface is made of Vircolite Plastic "Tops of Quality" at no extra cost. Also available in Eastern Maple.

Shipping Weight—40 lbs.



#464 -- an attractive, well constructed two pupil table, rectangular in shape, with center division under top book compartment, thereby functioning as two tables in one.

#464 may be had with or without Virco's exclusive micrometer adjustment in three graded heights. Vircolite Plastic "Tops of Quality" at no extra cost. Also available in solid Eastern Maple.

Ideal where classroom space is limited, this model is a popular favorite with school administrators.

Shipping Weight—55 lbs.

#468 -- This practical two-pupil table is half-round in design and gives even greater separate working area and book compartment privacy.

May be purchased with or without the exclusive Virco micrometer adjustment in three graded heights. Its heavy duty construction and attractive modern lines insure many years of usefulness in any classroom. Vircolite Plastic "Tops of Quality" at no extra cost. Also available in solid Eastern Maple.

Shipping Weight—55 lbs.

RECOMMENDED IN VIRCOLITE PLASTIC "TOPS OF QUALITY"

#470 is the larger six pupil rectangular table with the exclusive Virco micrometer adjustment, in three graded heights.

Designed for extreme utility, well built and attractive in appearance, this table is ideal for all classroom group activities, such as finger-painting, etc. Working surface is of Vircolite Plastic "Tops of Quality" at no extra cost. Also available in birchface hardwood plywood. Model #470 may be had without the micrometer adjustment if desired and book compartments are optional at slightly higher cost.

Model #472 is the same as above, except is wider and longer, allowing for eight pupils.

#470 Shipping Weight—75 lbs.
#472 Shipping Weight—90 lbs.

RECOMMENDED IN VIRCOLITE PLASTIC "TOPS OF QUALITY"

VIRCO half-round two-pupil table #468



#468

VIRCO classroom table #470



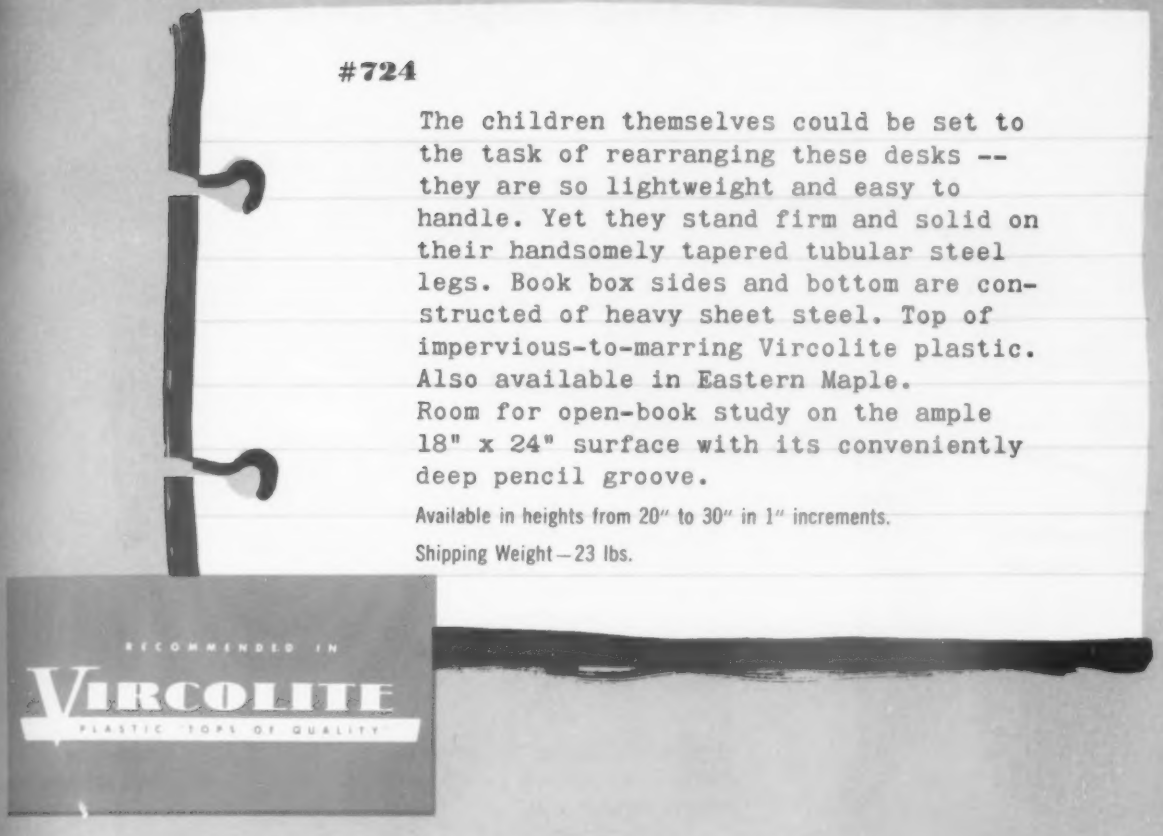
#470

VIRCO open front desk #724 .....



VIRCO lift lid desk #729 .....



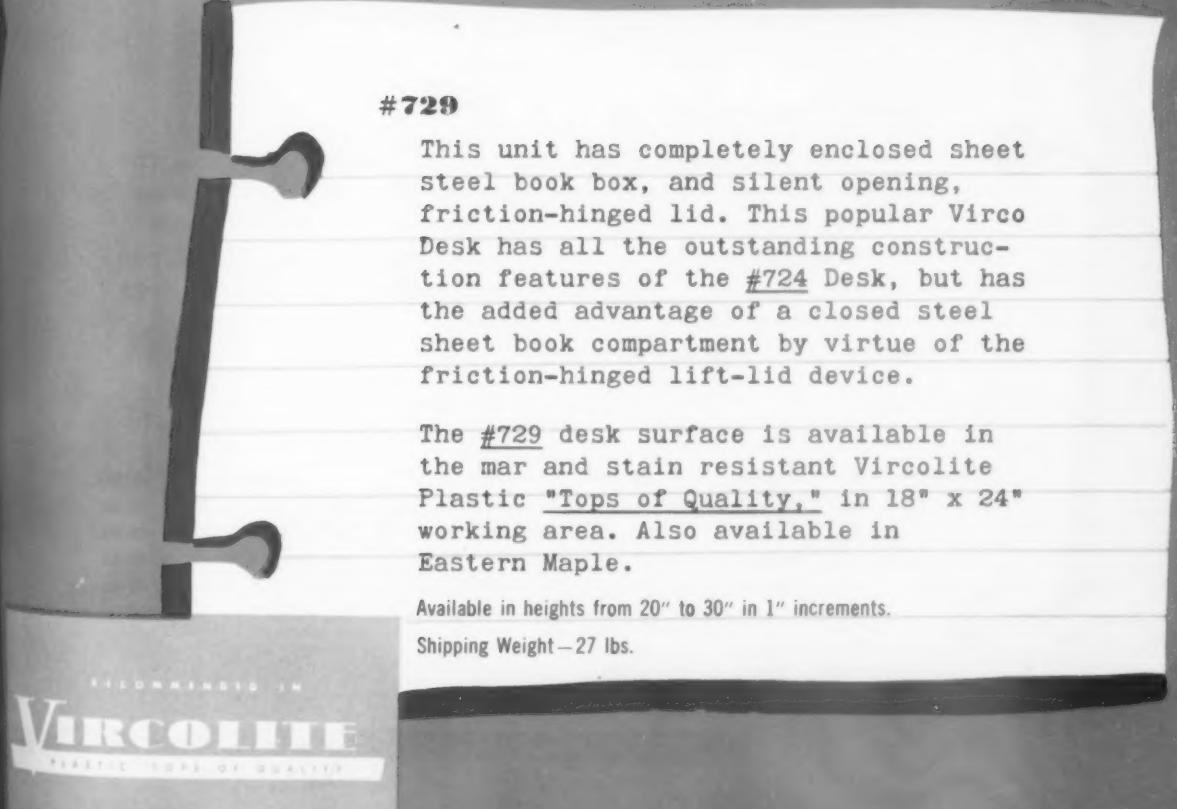


#724

The children themselves could be set to the task of rearranging these desks -- they are so lightweight and easy to handle. Yet they stand firm and solid on their handsomely tapered tubular steel legs. Book box sides and bottom are constructed of heavy sheet steel. Top of impervious-to-marring Vircolite plastic. Also available in Eastern Maple. Room for open-book study on the ample 18" x 24" surface with its conveniently deep pencil groove.

Available in heights from 20" to 30" in 1" increments.

Shipping Weight—23 lbs.



#729

This unit has completely enclosed sheet steel book box, and silent opening, friction-hinged lid. This popular Virco Desk has all the outstanding construction features of the #724 Desk, but has the added advantage of a closed steel sheet book compartment by virtue of the friction-hinged lift-lid device.

The #729 desk surface is available in the mar and stain resistant Vircolite Plastic "Tops of Quality," in 18" x 24" working area. Also available in Eastern Maple.

Available in heights from 20" to 30" in 1" increments.

Shipping Weight—27 lbs.

VIRCO one & two-pupil tables #600 series



#600 Series

The Classroom giant can be as comfortable as the "shortie" at this easy-to-adjust table. Top can be raised or lowered to any one of five different heights in an instant, and locks firmly in place. No bolts or protruding mechanism to scratch legs or snag hose. An exceptional utility table in either one or two-pupil size.

NO.	TYPE	TOP SIZE	TOP MATERIAL	HEIGHT	WEIGHT
615	One-pupil Table	18" x 24"	Hardwood or Plastic	Adj. 19"-24" & 24"-30"	42 lbs.
607	Two-pupil Table	20" x 42"	Hardwood or Plastic	Adj. 19"-24" & 24"-30"	50 lbs.
608	Two-pupil Table	24" x 48"	Hardwood or Plastic	Adj. 19"-24" & 24"-30"	56 lbs.
663	Six-pupil Table	30" x 60"	Hard.-Plywd. or Plastic	Adj. 19"-24" & 24"-30"	75 lbs.
610	Eight-pupil Table	36" x 72"	Hard.-Plywd. or Plastic	Adj. 19"-24" & 24"-30"	115 lbs.

RECOMMENDED FOR VIRCOLITE PLASTIC TOPS OF QUALITY

VIRCO activity table #3000 series



#3000 Series

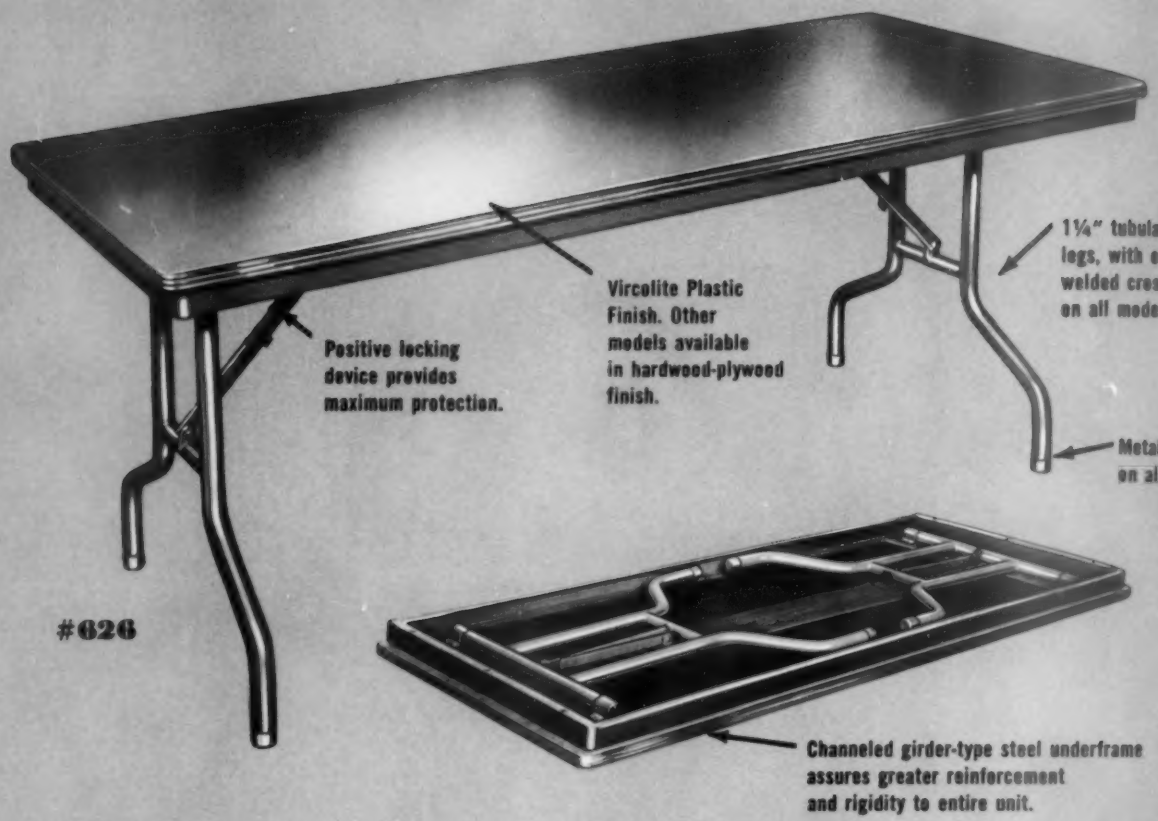
The new Virco "Activity Table," #3000 is an attractive, modern design table, extremely functional in use and purpose. Constructed of fine quality 1¼" heavy gauge tubular steel, automatically formed with continuous, smooth welds, the Virco "Activity Table" is built sturdy and strong for durability and long life. The Vircolite Plastic "Tops of Quality" are stain and mar resistant and never need replacement, thus insuring the lowest possible maintenance cost. This new Virco "Activity Table" will fill many needs in classrooms and study halls.

Well constructed and scientifically designed the Virco #3000 series table is priced for the most modest budget.

#3672 36" x 72". 80 lbs.
#3060 30" x 60" 65 lbs.

RECOMMENDED IN VIRCOLITE PLASTIC "TOPS OF QUALITY"

VIRCO folding leg banquet tables #626



Virco Folding Tables are constructed of the finest materials and are built extra strong to make them sturdy and rugged. Their advance design reduces weight to a practical minimum, without sacrificing strength and durability. Easy to handle and store compactly. Ideal for restaurants, cafeterias, hotels, schools, offices, workshops, laboratories, showrooms, conference rooms and a multitude of other uses.

Virco Folding Tables, because of their beauty, versatility and economical maintenance are being specified more and more by leading institutions, commercial and industrial firms throughout the nation.

Tables are available in 21", 24" and 29" heights

NO.	SIZE	TOP MATERIAL	STYLE	WEIGHT	NO.	SIZE	TOP MATERIAL	STYLE	WEIGHT
646	30" x 72"	Vircolite	Heavy Duty	69 lbs.	641	30" x 96"	Masonite	Heavy Duty	85 lbs.
625	36" x 72"	Vircolite	Heavy Duty	77 lbs.	656	30" x 72"	Masonite	Standard	55 lbs.
626	30" x 96"	Vircolite	Heavy Duty	87 lbs.	666	30" x 96"	Masonite	Standard	65 lbs.
645	30" x 72"	Masonite	Heavy Duty	69 lbs.	732	30" x 72"	Plywood	Heavy Duty	58 lbs.
640	36" x 72"	Masonite	Heavy Duty	80 lbs.	733	30" x 96"	Plywood	Heavy Duty	68 lbs.

VIRCO typing table #658A



#658A

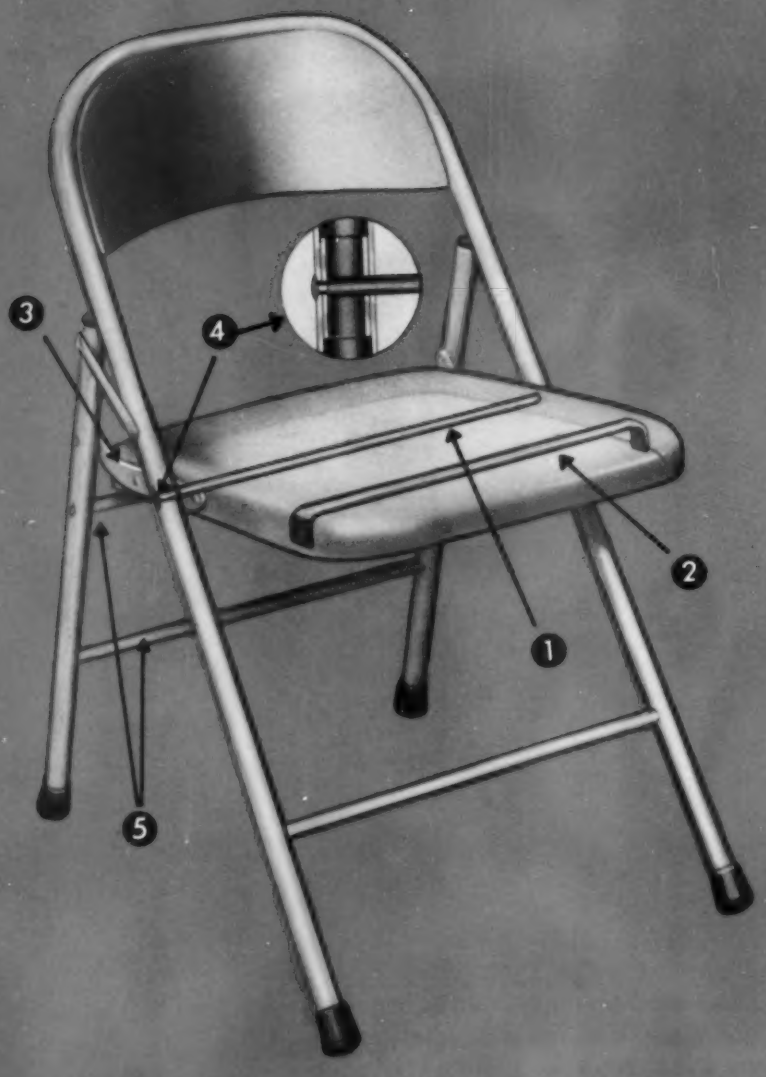
Virco Typing Table #658A, with the adjustable legs, is an attractive, well constructed, popular addition to the Virco line of "Classroom Tested" School Furniture. Sturdily built of tubular steel construction, this unit is available in either Vircolite Plastic "Tops of Quality," or solid hardwood.

Leg adjustment is from 24" to 30" in height.

Shipping Weight – 46 lbs.

RECOMMENDED IN
VIRCOLITE
PLASTIC TOPS OF QUALITY

VIRCO "can't tip" folding chairs, *3 styles*



Virco Plus 5

1. **EXTRA** solid steel rod -- NOT RIVETS -- which seat pivots between front legs.
2. **EXTRA** tubular reinforcing brace under front of seat.
3. **EXTRA** solid steel reinforcing plates at sides of seat.
4. **EXTRA** steel tubular reinforcement inside front legs at seat pivoting point.
5. **EXTRA** steel brace between rear legs -- BRACES INSTEAD OF ONE.

The new Virco "Can't Tip" safety tested folding chair has many outstanding characteristics and will give years of rugged service.

Made of heavy gauge steel and electrically welded construction, the Virco Folding Chair comes in three styles, with contour seat and back, is attractive, lightweight and durable, completely free of tipping, pinching or snagging hazards. Folds easily and stacks compactly.



#127 All Steel -- One-piece form fitted steel seat. Edges curled for added rigidity and smoothness.



#129 Plywood Seat -- Contoured seat of hardwood plywood, riveted to tubular steel frame for extra strength. Finished in stain-resistant, chip-resistant high quality lacquer.



#130 Padded Seat -- Upholstered seat of super-strength Vinyl plastic -- well padded -- secured to frame by "T" nuts, which permit easy removal. Wide selection of colors.

"classroom-tested" school furniture

VIRCO
MANUFACTURING CORPORATION

P. O. BOX 44846, STATION H, LOS ANGELES, CALIFORNIA
MFG. PLANTS, LOS ANGELES, CALIF. AND CONWAY, ARK.

D-3/VO

Schooline WARDROBE SYSTEMS

Chalkrobes *Corkrobes* *Wallmounts*

U. S. Pat. Office for VOSEL-PETERSON TRADE MARK



Board side

Chalkrobe*

The CHALKROBE provides two adjustable height 4 ft. hat shelves, one 4 ft. shoe shelf, and two 4 ft. coat rails, to hold spaced coat hangers and/or coat hooks, and a 50" x 48" chalkboard complete with tray, in one movable floor stand unit.



Corkrobe*

The Corkrobe provides two adjustable height 4 ft. hat shelves, one 4 ft. overshoe shelf, two 4 ft. coat rails to hold coat hooks and/or coat hangers, and a 50" x 48" corkboard.



The Wardrobe System that provides *Low Cost Flexibility*

Schooline Wardrobes are versatile because—

- They give multiple use (chalkrobe—corkrobe combinations)
- They are movable or stationary—come on glides—casters or can be anchored to floor or used in combination with wall mounted units.
- They are *adjustable* in height to accommodate all age groups and *adjustable* for spacing between shelves.
- They can be used with coat hangers or hooks or both, and provide shelf space for overshoes, lunch boxes etc.
- They can be grouped for special adult functions.
- They can be arranged as screens to divide groups.
- They can be interlocked and assembled to make rigidly joined multiple units. They have large capacity for size and are fireproof and vermin-proof.

Schooline Wardrobes Promote Orderliness—

- There are provisions for wrap—cap—shoe and lunch box care.
- They give maximum capacity in minimum space.
- They keep wraps aired, dry and exposed to the light.

Schooline Wardrobes are Built to Withstand Hard Abusive Use.

Checker

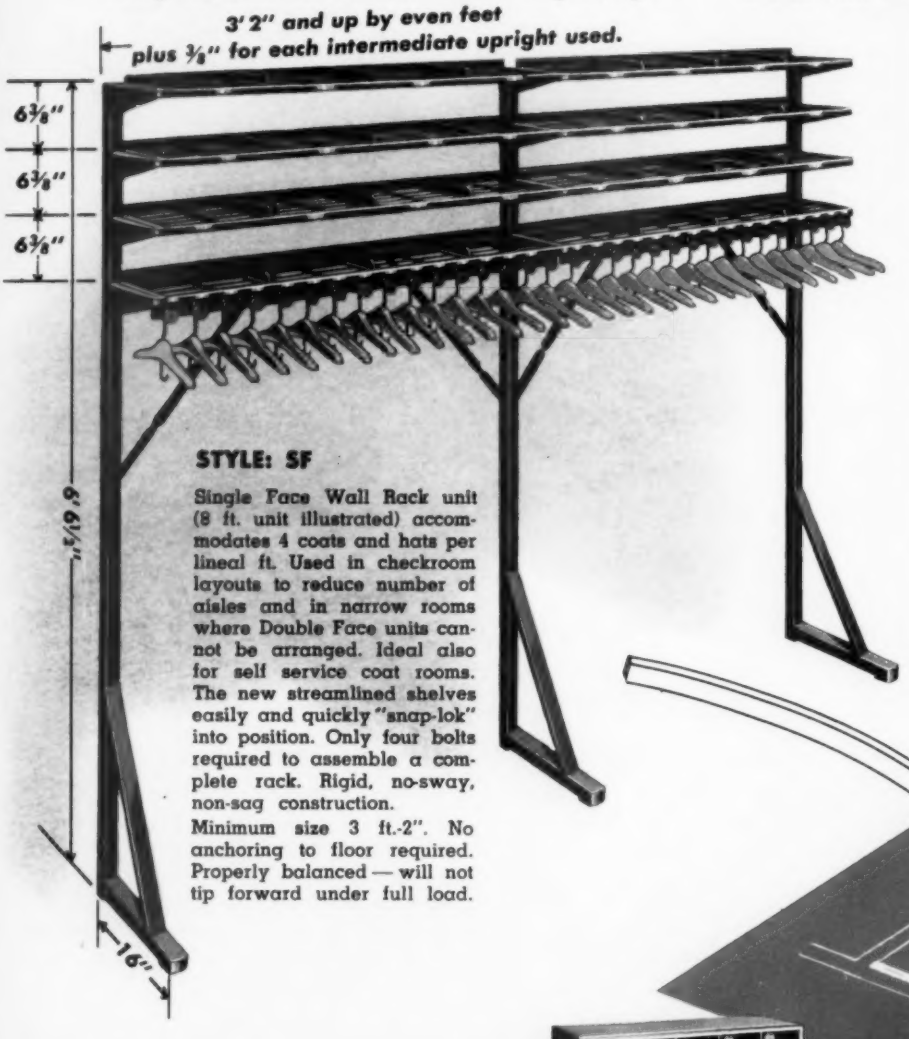
Trade-Mark Registered—U. S. Pat. Off.

COAT and HAT RACKS

Vogel-Peterson checkroom equipment is the finest available, correctly designed and unequalled in quality. It is constructed of electrically welded heavy gauge steel, with square tubular posts.

Available in standard units 3, 4 and 5 ft. long that interlock to make any length.

Vogel-Peterson High Relief, "Dust Free" Hat Shelves. These shelves are perforated and multiple embossed with narrow longitudinal ribs that keep hats clean and dry. This durable, modern shelving is built for lifetime service. The hanger rail shelves will support at least 100 lbs. per running foot.



STYLE: SF

Single Face Wall Rack unit (8 ft. unit illustrated) accommodates 4 coats and hats per lineal ft. Used in checkroom layouts to reduce number of aisles and in narrow rooms where Double Face units cannot be arranged. Ideal also for self service coat rooms. The new streamlined shelves easily and quickly "snap-lok" into position. Only four bolts required to assemble a complete rack. Rigid, no-sway, non-sag construction.

Minimum size 3 ft.-2". No anchoring to floor required. Properly balanced — will not tip forward under full load.

Planning an Efficient Checkroom

Recommended factor ¾ sq. ft. per hanger capacity. This will permit a complete checking service for coats and hats—umbrella and overshoe requirements.

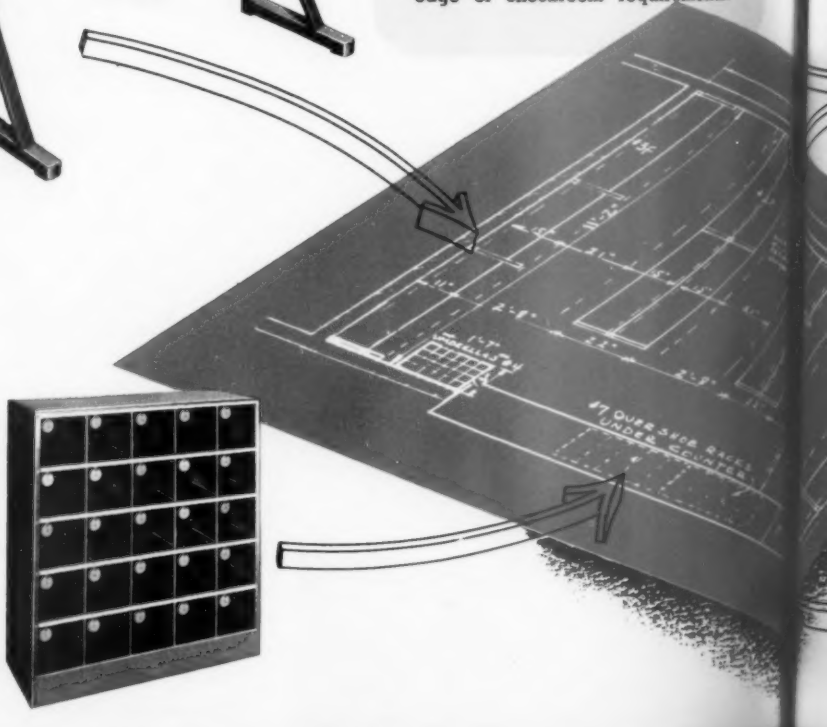
Minimum ceiling height—7 ft.

Standard spacing of coat hangers is on 3" centers (4 to the lineal ft.). Capacity can be increased 25% by spacing hangers 2½" on center (5 to the ft.). Layout service is offered to architects and building owners without charge.

Send

1. Floor Plan (indicate door and window openings, radiators, pipes, etc.)
2. Capacity to be accommodated
3. Type of installation—permanent, portable or combination of permanent and portable.

Avail yourself of our 30 years' experience and practical knowledge of checkroom requirements.



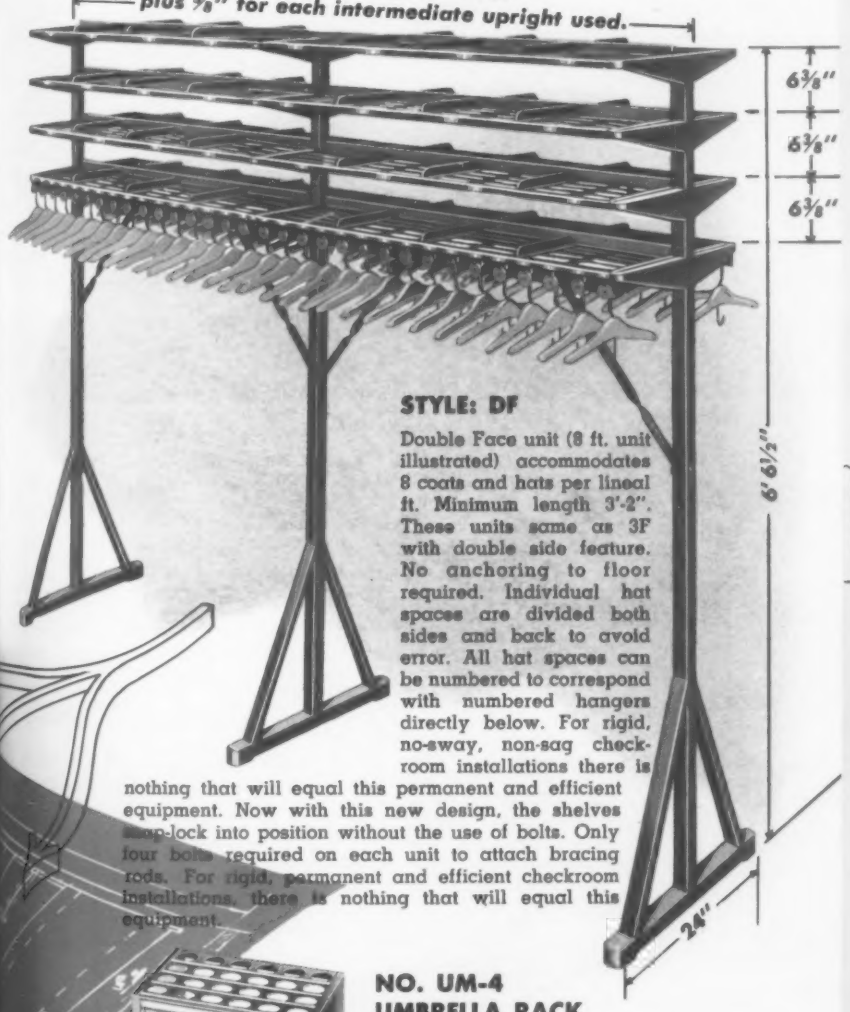
OVERSHOE RACK NO. OS-7

A checkroom necessity in climates where rubbers and galoshes are used. Approximately 20% of the total hanger capacity is usually a sufficient amount. Compartments measure 6" x 6" x 13" deep. These units become an integral part of the 1-check system when used with checkroom coat and hat racks. Furnished in standard size units of 25 capacity 31" wide, 13⅜" deep x 33" high.

For over 30 years specified by leadi

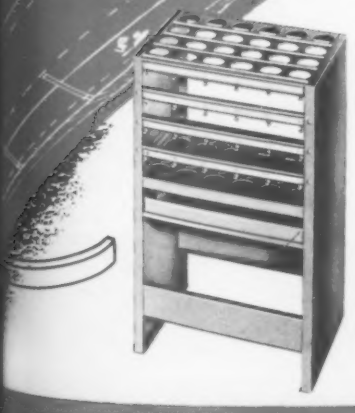
SPEED UP CHECKING SERVICE WITH THE *One-Check System*

With this system a single check identifies all items checked, whether it be one or several. Each coat on a numbered hanger space—each hat in a correspondingly numbered hat space. Canes, umbrellas and overshoes are placed in systematically numbered umbrella or overshoe racks. Cross checks from overshoe and umbrella racks may differ—still are immediately keyed to master guest check. There is no lost time, no errors, confusion, delays nor complaints, because guests need carry only one check, which ends necessity of multiple handling by attendants.



STYLE: DF

Double Face unit (8 ft. unit illustrated) accommodates 8 coats and hats per lineal ft. Minimum length 3'-2". These units same as 3F with double side feature. No anchoring to floor required. Individual hat spaces are divided both sides and back to avoid error. All hat spaces can be numbered to correspond with numbered hangers directly below. For rigid, no-sway, non-sag checkroom installations there is nothing that will equal this permanent and efficient equipment. Now with this new design, the shelves snap-lock into position without the use of bolts. Only four bolts required on each unit to attach bracing rods. For rigid, permanent and efficient checkroom installations, there is nothing that will equal this equipment.



NO. UM-4 UMBRELLA RACK

A very important checkroom accessory which answers the "what to do with wet umbrellas" question. Racks are systematically numbered. Round umbrella dividers are hemmed to give a smooth no-tear edge. Come in standard units of 16 and 24 capacity sizes. Height, 28"; depth, 13"; width, 16 capacity, 12¼"; width, 24 capacity, 17¾". These units also an integral part of "One-check system." Approximately 20% of hanger capacity meets overall requirements.

Specifications and Construction Details

UPRIGHT FRAME

Welded into one rigid unit. Posts 1½" x 1½" x 18-gauge welded square tubing. Shelf arms—tapered U-channel 20-gauge punched out to engage 1½" sq. post and welded thereto. Arms are reinforced with inserted U-Channel—ends capped with round formed stamping. Hat shelves engage into slots in arms by means of intrecal self-locking clips.

Bases #16 gauge 1⅝" wide x 1¼" high and punched out to engage post and welded thereto. Box inserts raise base member at extreme end ¼" from floor. Base ends are capped with round formed stamping welded into ends. Diagonal brace of one-piece channel #18 gauge welded post to base.

SHELVES

One-piece design perforated and embossed sheets of 24-gauge steel welded into rigid channel angle and T frame.

Front channel 9/16" x 13/16 x 9/16" x 16 gauge.

Back Angle 1" x ½" x 16 gauge.

Ends are T-shaped 1¼" x ¾" x 16 gauge with two self-locking clips welded under each end.

Narrow longitudinal embossed ribs between perforations hold hats free of dust. Hat dividers embossed 1" high across shelves 12" on center.

Hanger rail is 1¾" flange extension of front channel of lower shelf only. Bottom of flange is hemmed to give smooth edge and reinforce V-punched notches that receive garment hangers. V-punched notches are on pre-determined-centers.

Sway Braces—3/16" x ¾" round edge steel.

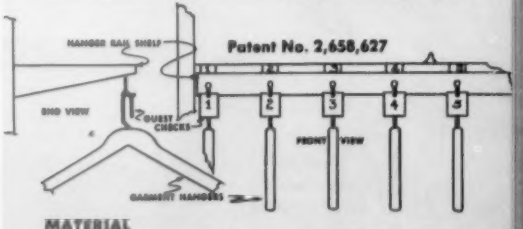
GARMENT HANGERS

Hardwood hangers. No. 10 hard steel rustless wire hook formed to receive guest checks on top (locks hanger on rail preventing knocking off accidentally) and with auxiliary hook beneath for shoe bags, umbrellas, etc.

NUMBERING AND CHECKS

Hanger and hat spaces numbered with large clear cut white numerals hot-stamped into clear extruded plastic clips that snap over front shelf channels—furnished only if specified.

Plastic checks 1½" x 1 1/16" with large clear hot-stamped numbers. Furnished only if specified. Checks furnished in three colors—Black—Gray—Red. Printed with name of user when specified.



MATERIAL

Cold-rolled smooth surface furniture-grade steel used throughout.

WELDING

All welding by automatically timed welders assuring positive fusion of materials.

FINISH

Steel is washed and rust-proof coated before application of enamel. Enamel is baked-on at 350°. Baking time thirty minutes.

Standard colors—V. P. Brown—Gray or Green.

CAPACITY

Standard spacing of hangers is 3" o.c. or four to the foot. Can be furnished on 2½" o.c.—five to the foot—or 4" o.c.—three to the foot—when specified.

CASTERS

3-inch Ball-bearing Swivel Casters.

Furnished only when specified. It is not recommended that casters be used on racks exceeding ten feet in length.

All racks ordered with casters are furnished with bottom bracing and gussets extending between base sections of uprights. (See illustration Checker #DF 5-50.)

NOTE: Wall-mounted units are same construction as shelf portion of rack SF with holes punched through tubing for wall mounting. Screws — toggles or expansion bolts for wall fastening are not furnished.

SPECIAL: All units can be ordered with special spacing between shelving or with fewer than four shelves, which is standard.

ead chitects engineers and furnishers

Schooline* Dual-Purpose, Adjustable Height WARDROBE RA

FLEXIBLE SCHOOL WARDROBE RACKS BACKED WITH EITHER A QUALITY FRAMED CHALKBOARD OR CORKBOARD



Chalkrobe* (illustrated left)

No. CH-400 Chalkrobe

an efficient 4 ft. 2" welded steel wardrobe rack unit that permits absolute flexibility in school design. It has large capacity, goes anywhere, can be used singly or in groups and provides a movable chalkboard.

Hat shelves with coat rails are adjustable for height to accommodate different age groups. They provide pupils with a ventilated shelf space, a coat hook or coat hanger and an off-the-floor rack for overshoes. They come on glides, on ballbearing casters or can be anchored to the floor. Built for lifetime service of heavy gauge welded steel, they are permanently beautiful in modern Desert Sage baked enamel.

Chalkrobes are backed with quality chalkboards—are dual purpose units.

Corkrobe*

No. CO-500 Corkrobe

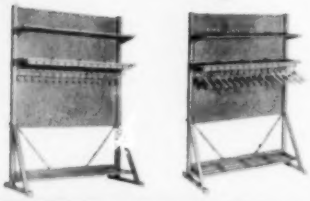
is identical in frame, adjustable shelves, capacity and features to the **Chalkrobe** described above, except that its screening back is a cork board. Framed in non-tarnishing moulding this 4'-2" x 4'-0" cork board provides a convenient surface for mounting maps, pictures, exhibits and announcements, etc. Not only as a compact efficient wardrobe but as a flexible teaching tool these units adapt themselves to any floor plan.

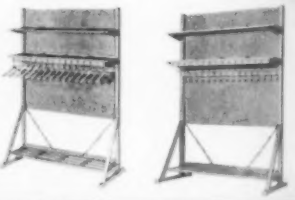


SPACED COAT RAILS TAKE COAT HOOKS OR COAT HANGERS

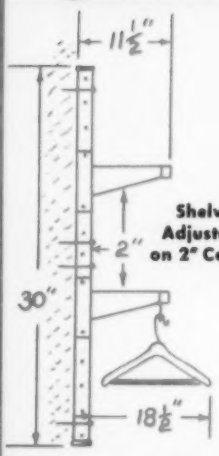


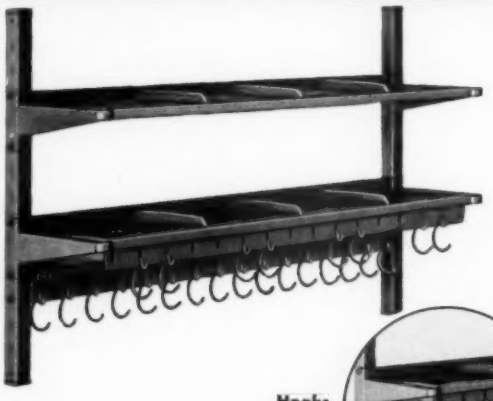
The full length coat rails on chalkrobes, corkrobes and wallmounts are punched to receive and position (spaced apart on 3" centers) either coat hooks or coat hangers. Standard 4'2" unit holds 16 coat hangers; or—24 coat hooks or in combination 16 hooks can be used with 16 hangers. (Specify quantity of hooks or hangers when ordering).

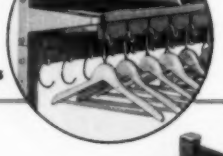




Schooline* Wallmounts – COAT, HAT and OVERSHOE RA







Hooks or Hangers

Wallmount* Wardrobe R

These efficient coat and hat racks come in 4'-2" length units which mount directly on any dependently or interlocked to make continuous any length—fit in any available space. They h capacity—hold 4 coat hangers or 6 coat hooks, hangers and 4 coat hooks, per running foot, ea apart from others.

With supporting columns permanently attached t the shelves are adjustable for height from floor, o apart, in 2" steps over a 30" range. Hence shelv adjusted at any time to serve any age group welded of heavy gauge steel they will stand up u of hard use.

No. AW-3 Wallmount Coat and Hat Racks ar
No. AW-4 Wallmount Coat and Hat Racks ar

Wallmount* Overshoe Racks

Designed for use in combination with Wallmount Wardrobe Racks.

Easily mounted on any available wall these sturdy racks keep overshoes etc., off the floor, in a safe orderly manner. Built of heavy gauge, welded steel U-forms they are strong, fire proof and vermin proof. They are so designed that basic 3'2" and 4'2" units can interlock to make a continuous rack of any length.

No. B-3 Wallmount Overshoe Rack is 3'2" long.
No. B-4 Wallmount Overshoe Rack is 4'2" long.



U. S. Patent Applied for

* VOGEL-PETERSON TRADE MARK

Schooline* Wardrobe Equipment is manufactured by

VOGEL-PETERSON CO. CHICAGO 9, U.

WESTMORELAND *Specifications*

For Posture Engineered School Seating



WESTMORELAND
No. 152-L DESK and No. 102 CHAIR

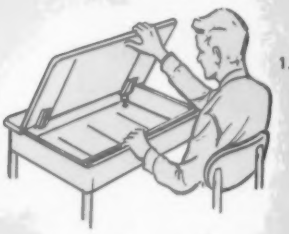
Westmoreland's lifting lid desks are posture-engineered to meet every classroom requirement and student need, with maximum flexibility and efficiency along with unusual economy. The book box is extra large, 23 x 17 x 4¾, with flat embossed steel bottom, front and sides, with oversize clean-out holes. These units are available with solid maple hardwood, or plastic two-piece tops. All units have Westmoreland's sturdy steel tubular construction.

SUGGESTED SIZING

Chairs (Height of Seat)	11"	12"	13"	14"	15"	16"	17"	18"
Desks (Height)	20" or 21"	22"	23"	25"	26"	27"	29"	30"
Kindergarten	40%	60%						
1st Grade	10%	70%	20%					
2nd Grade		40%	40%	20%				
3rd Grade			30%	60%	10%			
4th Grade				60%	30%	10%		
5th Grade				20%	60%	20%		
6th Grade					40%	50%	10%	
7th Grade					10%	60%	30%	
8th Grade						30%	60%	10%
Jr. High School						20%	50%	30%
Sr. High School and College							60%	40%

CHECK THESE—Quality Construction • Durability • Attractive Appearance • Easy Maintenance • ECONOMY

D-3/we



1. The book box bottom is embossed for strength and elimation of noise. Size: 23 x 17 x 4¾ for maximum utility. The lifting lid is non-slamming, noiseless and has a constant friction long-wearing fully-enclosed hinge which requires no maintenance.



2. All wood parts are attached with "Tamper"-proof clutch head screws. These screws will withstand about 1,000-lb. pull and will not split or rupture the wood. If necessary these screw holes can be re-used with little loss of holding power.





All welded joints are carefully fitted and prepared and oxy-acetylene welded—then properly prepared for finish coatings.



4. All tubular desks and chairs are equipped with large oversize 1-3/16" diameter glides. Glides will not mar the floor or come out of legs without special tools. The case hardened polished steel caps are securely crimped around the silencing molded rubber cushion and will not pull off.





5. Westmoreland gives you a lifetime desk top with sturdy fixed construction, with a proper light reflective surface that is strong, durable, and smooth. All tops are "Celsyn" finished.

6 Metal parts—bonderized before application of high bake enamel. Westmoreland's engineered posture back rest and seat provides perfect seating. There is no tendency for the student to slide forward, stoop or slump.



WESTMORELAND *Seating*

Division of WESTMORELAND METAL MFG. CO., MILNOR STREET AND ERIE AVE., PHILADELPHIA 25, PA.

WESTMORELAND *Specifications*

For Posture Engineered School Seating



WESTMORELAND

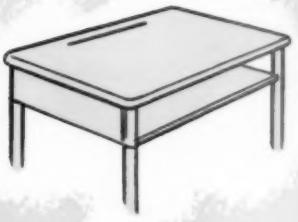
No. 151 Open-front Desk and the No. 101 Chair

Classrooms of today demand a flexibility of study arrangement. In Westmoreland's open-front desks and matching chairs, you will find a unit designed to meet the most rigid specifications. The unit is posture-engineered for student comfort and posture-seating. The seat is deeply saddled and the back molded for matching comfort. These units are available with Northern hardwood maple tops, seats and backs, and are also available with plastic or plywood tops and plywood seats and backs. All frames are Westmoreland tubular steel, guaranteeing long-life and low maintenance costs.

SUGGESTED SIZING

Chairs (Height of Seat)	11"	12"	13"	14"	15"	16"	17"	18"
Desks (Height)	20" or 21"	22"	23"	25"	26"	27"	29"	30"
Kindergarten	40%	60%						
1st Grade	10%	70%	20%					
2nd Grade		40%	40%	20%				
3rd Grade			30%	60%	10%			
4th Grade				60%	30%	10%		
5th Grade				20%	60%	20%		
6th Grade					40%	50%	10%	
7th Grade					10%	60%	30%	
8th Grade						30%	60%	10%
Jr. High School						20%	50%	30%
Sr. High School and College							60%	40%

CHECK THESE—Quality Construction • Durability • Attractive Appearance • Easy Maintenance • ECONOMY



1. The book box is a full-sized, roomy, sturdy, 20 gauge steel formed box with steel bottom and sides. An over-lined rail on the front edge of the steel bottom retards books from falling out. Extra large clean-out holes are provided in the book box shelf.



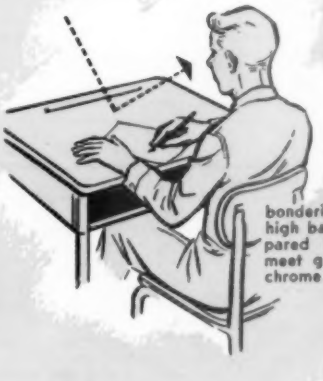
2. All wood parts are attached with "Tamper"-proof clutch head screws. These screws will withstand about 1,000-lb. pull and will not split or rupture the wood. If necessary these screw holes can be re-used with little loss of holding power.



3. All welded joints are carefully fitted and prepared and OXY-ACETYLENE welded. Then carefully prepared for finish coatings.



4. All tubular desks and chairs are equipped with large oversize 1-3/16" diameter glides. Glide will not mar the floor or come out of legs without special tools. The case hardened polished steel caps are securely crimped around the silencing molded rubber cushion and will not pull off.



5. Westmoreland gives you a flat-time desk top with sturdy fixed construction, with proper light reflective surface that is strong, durable and smooth. "Celsyn" finished. Metal parts bonderized before application of high bake enamel, or properly prepared for nickle-chrome finish to meet government specifications for chrome plating.



6. Westmoreland's engineered posture backrest and seat provides perfect seating. There is no tendency for the student to slide forward, stoop or slump.

WESTMORELAND *Seating*

Division of WESTMORELAND METAL MFG. CO., MILNOR STREET AND BLEIGH AVE., PHILADELPHIA 35

WESTMORELAND *Specifications*

For Posture Engineered School Seating

CHECK THESE—Quality Construction • Durability • Attractive Appearance • Easy Maintenance • ECONOMY

D-3/we



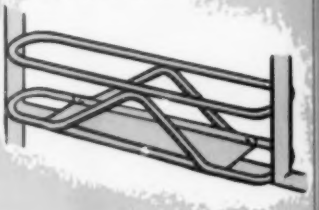


SILENT-NOISELES SEATING

Integrated moveable units by Westmoreland tend to eliminate the disorder and distractional noises implicit with the restlessness of your advanced students. No noisy moving parts.

ROOMY SANITARY BOOK BOX

Side mounted book storage offers easy access for student. Vertical positioning of material for ready visible reference. Maintenance—no corners to clean. A swipe of a cloth does it.



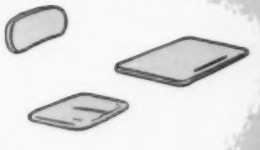


STRONG WELDED TUBULAR FRAME

1 Oxyacetylene brazed unit tubular frame—18 gauge electric welded steel tubing 1" outside diameter.
Stressed and Braced by engineering standards for adequate strength — rigidity and streamlined appearance.

SOLID NORTHERN HARD MAPLE WOODS

Tops, seats, and backs of well-seasoned Northern Hard Maple. A Plastic top of Multi-Ply Hardwood Plastic laminated construction available and known for its maintenance-free service.





LARGE — SILENT GLIDES

Equipped with oversize 1-3/16" diameter case hardened steel rubber cushioned glides. Will not dent, mar, or scratch today's school floor. Glides cannot be removed from legs without tools.

METAL AND WOOD FINISHES

All metal parts are bonderized before finishing with synthetic Urea enamel baked at more than 300° Farenheit. Available in Taupe, Coral, Blue, Turquoise. All wood parts are smoothly sanded prior to application of Glidden's "Celsyn" school finish.

WESTMORELAND
No. 201-STBR
Moveable Study top desks

For the modern classroom in upper grades, Westmoreland gives you a Study top desk—streamlined—space saving and efficient. Positive—Engineered—from its Deeply saddled seat to its extra area sloping top and roomy sanitary box storage rack. Built for the rough, rugged treatment expected from upper grade students.

Model	Seat Height	Desk Top	Front to back	Seat to top	Top to back
201-STBR	17" or 18"	17" x 23"	32½"	9"	13"

Shipping weight approximately 35 lbs.
Packed 1 per carton
Available with Solid Hard Maple or multi-ply Plastic tops.

WESTMORELAND *Seating*

Products of WESTMORELAND METAL MFG. CO., MILNOR STREET AND BLEIGH AVE. PHILADELPHIA 35, PA.

WESTMORELAND *Specifications*

For Posture Engineered School Seating



WESTMORELAND'S
NO. 170 SERIES
2 PUPIL ECONOMY DESK

For your overcrowded and space pressed classrooms, Westmoreland builds a two pupil student desk that will fit in with the flexibility of arrangement of single desks. These Economy Priced Westmoreland 2-Pupil desks have double the working area and storage space of the #150 series open front units. Per pupil cost is surprisingly lower. Westmoreland's Economy Priced classroom chairs are ideal companions for these desks.

Tops:—18" x 48". Solid maple or multi-ply plastic.



FOR YOUR UNUSUAL REQUIREMENTS:

A combination of Westmoreland's single and double desks with matching chairs, or Westmoreland's Study Hall seating units.

STRONG WELDED CONSTRUCTION

Strong Westmoreland Tubular construction — Oxy-acetylene welded tubular 18 gauge 1" electrically seam welded steel frames.



METAL AND WOOD FINISHES

All metal parts are bonderized before finishing with synthetic Urea enamel baked at more than 300° Fahrenheit. Available in Taupe, Coral, Blue, Turquoise. All wood parts are smoothly sanded prior to application of Glidden's "Celsyn" school finish.

LARGE—SILENT GLIDES

Equipped with oversize 1-3/16" diameter case hardened steel rubber cushioned glides. Will not dent, mar or scratch today's school floors. Glides cannot be removed from legs without special tools.



Here is the solution to your Study Hall and Lecture Room Seating. Westmoreland's study top desk—#160 series and chair with underseat Book Rack. Economically solves your "Per Student Cost" problem.

Tops:—18" x 24". Solid maple or multi-ply plastic

Both models available in all standard heights:
21"—22"—23"—25"—26"—27"—29"—30"
Available in frame colors—Taupe, Coral, Blue, Turquoise



WESTMORELAND
NO. 160 SERIES
STUDY TOP

WESTMORELAND *Seating*

Division of WESTMORELAND METAL MFG. CO., MILNOR STREET AND BLEIGH AVE., PHILADELPHIA 3

WESTMORELAND *Specifications*

For Posture Engineered School Seating



WESTMORELAND
No. 182 TABR TABLET-ARM CHAIR

...is the desk type tablet arm chair fitted especially for high school ...college classroom use. The wider than usual leg spread minimizes ...ing. The extra welded support member under rear of seat insures ...most rigid frame construction. The double tube front arm support ...ures vibration-free writing surface. Tops, seats, and backs of solid ...maple are posture engineered for perfect comfort of adult students. ...tablet arm is also available in 13 ply plastic.

Metal Colors: Taupe, Turquoise, Coral, Blue and Nickel Chrome.

Wood: Natural "Celsyn".

Large Roomy Tablet Arm 20" x 28".

Available in Seat Heights of 18", 17", 16".

Model—#182 TABR Solid Maple Seat, Back and Tablet Arm.

Model—#1823 TABR Solid Maple Seat, Back and 13 Ply Plastic Tablet Arm.

Also available with Crescent leg braces if book rack not required.

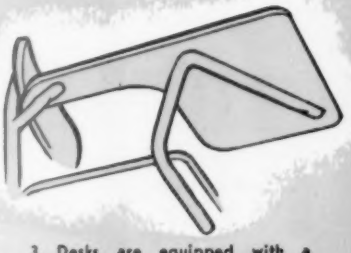
WESTMORELAND GIVES YOU MORE, DOLLAR FOR DOLLAR

D-3/we



1. Both the No. 182 hardwood and the No. 1823 plastic top desk-type tablet arm chairs are made with a special wider leg spread which resists student tipping.





2. The double tube front arm support, a tube within a tube, gives you maximum rigidity. The outside tube is 16 gauge—1" O.D. The inside is 18 gauge—⅞" O.D.



3. Desks are equipped with a large open book compartment under the seat providing ample room for student use. The welded "Boxed" construction assure great rigidity.



4. The glides will not mar or scratch floors. They are large 1-3/16" diameter, case-hardened, steel rubber-cushioned, glides.





5. All wood parts are "Celsyn" finish which has no equal as a coating for school furniture where a hard waterproof, printproof, scratch resistant, durable finish is required.

6. All joints OXY-ACETYLENE bronze-welded, insuring the most satisfactory weld without weakening the steel.





7. The Westmoreland's engineered posture seating insures a properly shaped backrest and seat for perfect poise and complete comfort.

WESTMORELAND *Seating*

...of WESTMORELAND METAL MFG. CO. MILNOR STREET AND ALLEGH...

WESTMORELAND *Specifications*

For Posture Engineered School Seating



WESTMORELAND
No. 171 TABLET-ARM CHAIR

Westmoreland's skilled engineering and modern production methods have resulted in a most economical tablet-arm chair. This posture-engineered tubular steel unit is designed for lifetime use and comfort, with a minimum of maintenance requirements. This tablet-arm chair is available in solid maple, maple plywood or plastic, with either a book-rack or crescent stretcher.

Available in 2 Proportion—Scale Sizes 17" or 18" Seat Height				
Model No.	No. 171	No. 172	No. 1713	No. 1723
Back:	Plywood	Solid Maple	Plywood	Solid Maple
Seat:	Plywood	Solid Maple	Plywood	Solid Maple
Tablet Arm.	Plywood	Solid Maple	Plastic	Plastic
Arm Width	Front - 12"	Rear - 4⅛"		
Arm Length	24"			

CHECK THESE—Quality Construction • Durability • Attractive Appearance • Easy Maintenance • ECONOMY



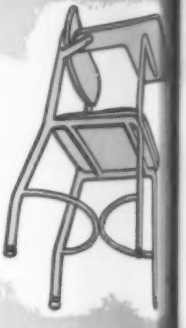
1. Tablet-arm 7-p… hardwood.



2. Seat 5-ply ⅜ hard-wood contour roll seat front.



3. Back rail 5-ply 7/1… hardwood.



4. Frame: 1"-OD—18 gauge steel tubing. Crescent bracing and tablet-arm support welded to frame for rigidity.



5. Rack 3 or 4-bar … available. ⅝" OD … gauge steel tubing.



6. The glides will not mar nor scratch floors. They are large 1-3/16" diameter, case-hardened steel, rub-ber-cushioned, glides.





7. Finish. Wood surfa… are smoothly san… and finished with G… den's "Celsyn" h… rich natural col… Metal frames … available in five h… monizing shades … coral, blue, taupe, … quoise and chro…

All metal parts are bonderized before enameling … baked at more than 300°F to insure against rust … peeling, flaking or discoloration. All plywood p… have maple or birch faceplies. Urea resin glue bond… assures no warping or separation of lamination. … solidwood parts are Northern Hard Maple. Pl… arms are 11-ply birch with rotary birch pat… melamine plastic surface.

WESTMORELAND *Seating*

Division of WESTMORELAND METAL MFG. CO., MILNOR STREET AND BLEIGH AVE., PHILADELPHIA 3…

WESTMORELAND *Specifications*

For Posture Engineered School Seating



WESTMORELAND

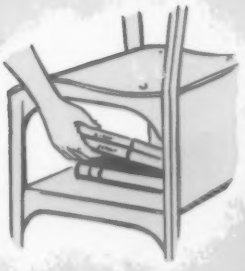
300 Series — FORMED STEEL CHAIR DESKS

moreland builds these chair desks with an eye to ficability, appearance and economy. For your space budget. These 300 series desks are highly mobile, ble, and POSTURE-ENGINEERED with Westmore- fabrication from heavy gauge steel. Available in PROPORTION-SCALED sizes, and four colors: Coral, Blue, Turquoise. Hardwood Plywood, Plastic id Maple tops.

Grade	Seat Height	Seat Size	Top Size	Desk to back
VI-adult	17"	15" x 14¾"	16" x 22"	12¾"
III-VI	15"	14" x 13"	14" x 20"	10¾"
II-III	13"	12" x 11"	13" x 18"	9¼"

CHECK THESE—Quality Construction • Durability • Attractive Appearance • Easy Maintenance • ECONOMY

D-3/we

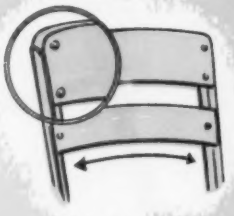


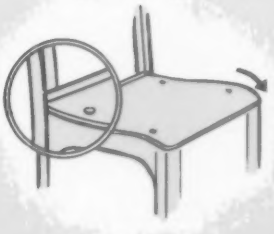
LARGE ROOMY BOOK STORAGE

Oversize, roomy book storage compartment designed for easy cleanout. Available with closed third side at slight extra cost.

DEEP BARRELLED BACK RESTS

Strong 5 Ply — 7/16" back rails—deep curved for comfort. Riveted to chair frame for trouble free usage.





POSTURE-ENGINEERED CONTOURED SEATS

5 ply hardwood plywood seats with rolled front edge to eliminate under-knee pressure. Front and sides of seats trimmed within framework of chair. Rear edge of seat housed in steel channel.

STURDY RIGID TOP SUPPORT

Extra rigid "V" formed welded steel top support. "Student sitting" will not permanently disalign.





EASY POSITIVE TOP ADJUSTMENT

Double action adjustment using "School proven" principles, assures easy adjustment and constant, trouble-free positioning of top in any position.

METAL AND WOOD FINISHES

All metal parts are bonderized before finishing with synthethic Urea enamel baked at more than 300° Farenheit. Available in Taupe, Coral, Blue, Turquoise. All wood parts are smoothly sanded prior to application of Glidden's "Celsyn" school finish.

WESTMORELAND *Seating*

of WESTMORELAND METAL MFG. CO., MILNOR STREET AND BLEIGH AVE. PHILADELPHIA 25, PA.

WESTMORELAND *Specifications*

For Posture Engineered School Seating



WESTMORELAND

Series No. 66

Tubular Steel Folding Chair

Westmoreland's No. 66 all steel Tubular frame folding chair gives you all of the latest, time-proven construction features. These chairs are rugged—comfortable—pinch-proof—tiltproof—economical. For INDOOR and OUT-DOOR USE.

SPECIFICATIONS

FRAME:—Heavy 18-gauge electric seam welded steel tubing ⅞" outside diameter.

SEAT: 20 gauge shaped steel posture seat 15½" x 15½" with edges rolled under for reinforcement. Sides reinforced with heavy gauge steel.

BACK:—22 gauge steel formed for comfort. 6" x 15½".

FEET: Durable long lasting rubber feet over crimped steel foot caps.

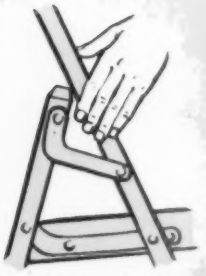
LEG BRACES: Both front and rear legs are braced with two strong steel braces to give extra rigidity and strength.

FINISHES: Metal parts properly cleaned and phosphate coated before application of Baked synthetic Urea Enamel. Standard Colors: Taupe, Coral, Turquoise, Blue.

Packed four chairs per carton. Shipping weight approximately 11 lbs. each.

Folded Dimensions—2½" x 17¾" x 39".

CHECK THESE—Quality Construction • Durability • Attractive Appearance • Easy Maintenance • ECONOMY



PINCH PROOF HINGES

Strong 12 gauge safety hinge will not pinch or bind. No mashed or broken fingers. Smooth natural folding action



DOUBLE BRACED LEGS

Rear legs additionally strengthened by two strong tubular braces welded for great rigidity. Front legs have a tubular brace welded to frame and a steel rod brace passing through seat assembly.



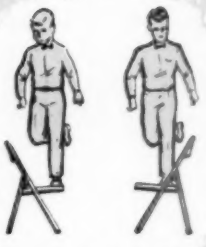
NON MARRING RUBBER FEET

Tough mar proof rubber foot caps designed to secure over crimped on steel glider cap. Will not loosen with usage but can be replaced.

CONTOUR COMFORT BACK REST

Comfort is insured by contour formed steel backrest with full rolled bottom edge for strength and elimination of tearing and injury hazards. Securely welded to chair frame.





NON-TIPPING

Complete freedom from tipping makes this the true safety chair.



REINFORCED SEAT

Underseat reinforcing member along with heavy steel side plates and continuous seat rod insures extra rigidity. "Safety" rolled edges prevent finger injury.

WESTMORELAND *Seating*

Division of WESTMORELAND METAL MFG. CO., MILNOR STREET AND BLEIGH AVE., PHILADELPHIA 35, PA.

ANDERSON-HICKEY COMPANY

P.O. Box 8006, Nashville 7, Tenn.



An Apple for the teacher

ANDERSON-HICKEY'S SCHOOL FURNITURE IS SURE TO BE THE APPLE OF ANY TEACHER'S EYE



METAL EXECUTIVE DESK

SERIES 4000

- 30" x 60" ROUNDED TOP
- LINOLEUM TOP
- INTERCHANGEABLE DRAWERS
- ALL CORNERS AND EDGES ROUNDED
- BURNISHED ALUMINUM HARDWARE
- CENTER DRAWER LOCKS ALL DRAWERS
- STAINLESS STEEL BINDING AND CORNER CAPS



FILING CABINETS . . .
5 COMPLETE LINES FOR EVERY FILING NEED.

SINGLE PEDESTAL DESK
(#4003) 45" x 30"

- OUTSTANDING QUALITY
- SUPERIOR CONSTRUCTION
- ATTRACTIVELY DESIGNED
- FEATURING THE NEWEST COLOR COMBINATIONS





STEEL CABINETS
COMPLETE LINE OF

- STORAGE
- WARDROBE
- COMBINATIONS

23 SIZES AVAILABLE



METAL TABLES

SERIES 4000

- SMART DESIGN
- EXCELLENT QUALITY
- SMOOTH TOP OF DURABLE LINOLEUM



≫ ≫ Write us for free catalog & name of your nearest dealer ≫ ≫ ≫

ANDERSON-HICKEY COMPANY
P.O. BOX 8006
NASHVILLE 7, TENN.

ARLINGTON SEATING COMPANY

Arlington Heights, Illinois

Here is modern seating equipment, to meet the needs of every type of classroom and grade. Major types of equipment are shown and briefly described. Complete information is available by writing for Arlington Catalog No. 55. All Arlington equipment is guaranteed in workmanship and quality of materials . . . the guarantee of a firm with a reputation for dependable service for over fifty years. Your inquiry is invited.

THE MOVE ABOUT No. 550

Designed to meet every requirement of the modern coordinated classroom. Range of sizes plus adjustability of both desk and seat permit comfort and healthful posture for every grade. Natural rest position of lid is 10° slope for comfort in reading, writing and drawing. Lid also adjusts to level for manipulative projects.

Seat swivels up to 45° to left or right for comfort and correct body posture. Spacious book box gives ample room for storage with easy accessibility. Friction hinges hold lid up until pushed down . . . protecting hands and fingers. Available in three popular sizes:

Size A, grade 5 to adult . . .
Size B, grade 2 to 6 . . .
Size C, grade 1 to 3.



INDIVIDUAL TABLE DESKS

New post design with meeting point at foot well forward of center, reduces floor space requirements per student . . . makes for easier entrance and departure. Tops made of solid close-grained hardwood with rounded corners. Built for use with No. 303 All Purpose Chair. Model No. 850 built with lift top. Choice of sizes with 21", 23", 26" and 29" table heights.



No. 840



No. 850

ARLINGTON SEATING COMPANY



All Purpose Chair . . . a durable unit for use with tables or table desks.



TABLES • CHAIRS

Arlington tables are supplied in both rectangular and trapezoidal shapes . . . to give the greatest amount of flexibility in modern classroom arrangement. Ideal for projects, group lectures, demonstrations and conferences. Book compartments can be supplied as an optional extra, installed on one or both sides.



TABLET ARM CHAIR No. 202

An attractive chair, engineered to take rugged everyday classroom use . . . yet it's light in weight. Spacious book compartment. Roomy 11½" x 24" sloping hardwood writing surface. Posture correlated seat and back.



MOVABLE CHAIR DESK No. 101

A comfortable, durable desk providing strength without excess weight. Large desk surface made of northern grown Hard Maple. Made in three sizes with desk heights adjustable to suit each grade. Size range is: A, grade 5 to adult . . . B, grade 3 to 6, and C, grade 1 to 3.

Other products in Arlington's complete seating equipment line are: study top desks; typing desks, for high school or adult use; stadium chairs; and chapel seating. You will find detailed information on these and many other items in Arlington Catalog No. 55. A free copy will be sent to you upon request.

send for this free catalog!



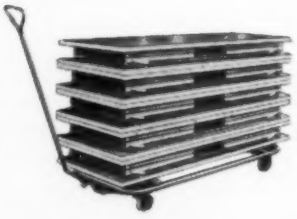
THE BREWER-TITCHENER CORPORATION

118 Port Watson St., Cortland, N. Y.



HEXACOMB TOP Magnified view shows thousands of impregnated air cells which reduce table's weight.





STORAGE TRUCKS FOR FOLDING TABLES

Convenient way to transport and store Hostess Banquet Tables. Truck holds 12 tables. All-steel construction, detachable towing handle. Front casters swivel, rear wheels fixed for easy steering. Stacks when not in use.

BTC® Hostess

FOLDING BANQUET TABLES

Hostess tables are the practical, handsome answer to requirements for multiple use rooms. They have strong, all-steel frames and fully-braced tubular steel legs that are paired for quick set-up and take-down. Six tables stack 21″ high.

FEATHERLIGHT PEDESTAL TABLE

Modern as tomorrow's jet! Lightweight—6 ft. table with Formica top weighs slightly over 40 lbs. Strong—supports over thirty times its own weight! Ample knee room on all sides. Choice of thrifty Masonite or tough, colorful Formica over Hexacomb top construction in 6 or 8 ft. lengths with 30″ width, standard banquet table height. Packed 2 per carton.

STANDARD TABLE

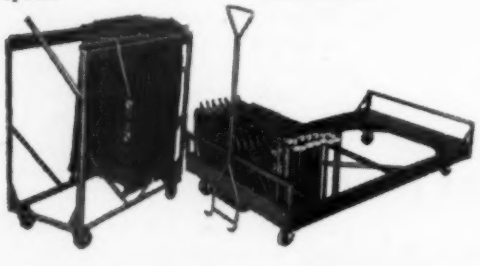
Strong, durable, good looking—all at a modest price. Inexpensive ½″ Fir Plywood top; tough Masonite top; or beautiful Formica top. 30 or 36 inch widths and 6 or 8 ft. lengths (6 ft. table seats 8; 8 ft. table seats 10). Packed 2 per carton. 60″ Round Table also available. Seats 8, has Plywood top. Packed 1 per carton.

VERTICAL CHAIR TRUCK

Move and store 24 chairs with ease. Stores in minimum space.

HORIZONTAL CHAIR TRUCK

Built for understage storing. Transports 36 chairs—can be hooked in tandem.



FOLDING CHAIRS

BTC chairs are ruggedly constructed, well-balanced and open or close with one easy motion. Finished in colorful baked enamels with a wide choice of fabrics for seats and backs. Soft, rubber feet are noiseless, prevent skidding or marring of floors. Ganging and aisle spacing braces can be supplied.

SPECIFICATIONS "X" type construction. All-steel, riveted for strength. Rubber foot pads. Choose back and seat upholstery from 15 colorful Duran or Boltaflex plastic coverings. Choice of 14 rich baked enamel finishes. 210 colorful combinations. Packed 6 chairs per carton.



WRITE FOR BULLETINS illustrating and describing BTC Folding Chairs and Tables.

BUCKEYE GLIDE CO. INC.

29 East 21 Street, New York 10, N. Y.

BUCKEYE SPRING-KUSHION GLIDES
'HEAVY DUTY'

Quiet Moving on All Floors, Including Stone

NOISELESS FURNITURE GLIDES

FOR EVERY TYPE CHAIR — DESK — TABLE — WOOD OR METAL

Buckeye Spring-Kushion Glides are designed to stay attached to the furniture. Also to help prolong its use.

The deep hardened steel cap takes all the wear and gives years of service. Within and below the rubber cushion lies the heat tempered coil of spring steel. The hardened cap is highly polished and nickel plated.

BE SURE TO SPECIFY "THE ULTIMATE IN GLIDES" ON ALL NEW FURNITURE



TYPE N

FOR WOODEN FURNITURE

These two types can be supplied in the following diameters:

#116–¾"	#206–1¼"
#136–⅞"	#356–1½"



TYPE B

For metal furniture complete with nuts and lock washers.

Our "TMR" is designed to snap into tubing and lock inside by means of a tempered steel spring—this device can be supplied on any diameter glide—



TYPE TMR

The "TMR" is made to fit the following tubing:

⅝" O.D.	⅞" O.D.
¾" O.D.	1" O.D.



TYPE P

TO REPLACE CASTERS

These two types can be supplied in the following diameters:

#206–1¼"	#356–1½"



TYPE A

TO STOP WOBBLE

Type DS—Glides are furnished with hardened thread cutting shank. Will securely hold in ⅛" metal or thicker.

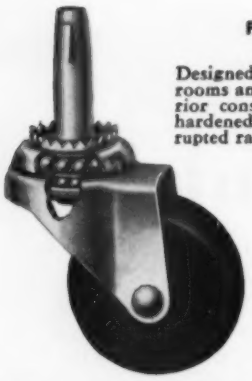
SEND FOR CATALOGUE AND PRICE LIST SAMPLES ON REQUEST

Type DSN—Glides are fitted with hardened drive screw nail. These will hold firmly in laminated wood.

FAULTLESS CASTER CORPORATION

DEPT. SU-55-56

REPRESENTATIVES IN PRINCIPAL CITIES **Evansville, Indiana** CANADIAN FACTORY: STRATFORD, ONTARIO



FAULTLESS DOUBLE BALL BEARING CHAIR CASTERS

Designed especially for use on chairs in offices, study rooms and libraries, where quiet is essential. Of superior construction, this caster has two full rows of hardened ball bearings swiveling freely in uninterrupted raceways. Low over-all height, dust-proof construction. Bearings lubricated at factory. Furnished with either Ruberex (cushion tread) or Plaskite (hard tread) wheel. A very easy swiveling caster.

Style No.	Kind of Wheel	Diam. of Wheel	Wt. Per Set of 4
2478	Ruberex	1⅜"	1 Lb. 3 Oz.
2479	Ruberex	2"	1 Lb. 8 Oz.
2378	Plaskite	1⅜"	1 Lb. 3 Oz.
2379	Plaskite	2"	1 Lb. 8 Oz.

Packed one set in a box.
Size Bore ⅜" x 1⅞".



Faultless Light Duty Truck Caster has two complete ball races, using best grade balls, all bearing surfaces hardened, special king pin construction, dust-proof. Furnished with Roller Bearing Ruberex or Plaskite wheels. A very strong, durable caster.

Style No.	Kind of Wheel	Diam. Wheel	Mounting Hole Spacings	Lbs. Cap. Each
1123-3	Ruberex	3"	3 x 3	175
1123-4	Ruberex	4"	3 x 3	225
1131-3	Plaskite	3"	3 x 3	300
1131-4	Plaskite	4"	3 x 3	350

Rubber Tired Wheels available

FAULTLESS DOUBLE WHEEL PIANO CASTER

This double wheel, double ball bearing, noiseless Piano Caster has two rows of ball bearings operating in lubricated hardened raceways. Used with No. 98 socket. Wood Ferrule for use over socket for large drilled hole. Supplied with a plate, where this type is needed.



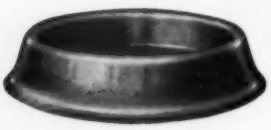
Style No.	Diam. of Wheel	Kind of Wheel	Wt. Per Set of 4
EW479-2	2"	Ruberex	2 Lbs. 4 Oz.
EW379-2	2"	Plaskite	2 Lbs. 4 Oz.

Size Bore ⅝" x 1½".
Packed one set in a box.

This Faultless Rigid Truck Caster is a desirable companion to the 1100-Series. Made of extra heavy gauge steel. The 1700-Series Rigid and 1100-Series Swivel Casters have the same mounting hole positions and same over-all height, for interchangeability and quick replacement.



Style No.	Kind of Wheel	Diam. Wheel	Mounting Hole Spacings	Lbs. Cap. Each
1723-3	Ruberex	3"	3 x 3	175
1723-4	Ruberex	4"	3 x 3	225
1731-3	Plaskite	3"	3 x 3	300
1731-4	Plaskite	4"	3 x 3	350





FAULTLESS DESK CUPS

Faultless Ruberex or Rockite Desk Cups are of nonbreakable, rust-proof composition, in a harmonizing brown shade.

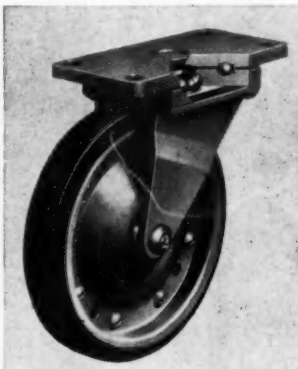
Round Shape Desk Cups

RUBEREX Style No.	ROCKITE Style No.	Wt. Per Set of 4
RC4 138	RC7 138	5 oz.
RC4 158	RC7 158	7 oz.

Square Shape Desk Cups

RUBEREX Style No.	ROCKITE Style No.	Wt. Per Set of 4
SC4 112	SC7 112	6 oz.
SC4 134	SC7 134	7 oz.
SC4 200	SC7 200	13 oz.
SC4 258	SC7 258	15 oz.

Packed one set in a box.



FAULTLESS DOUBLE BALL BEARING MEDIUM DUTY TRUCK CASTER

This Faultless Ball Bearing Swivel Caster is a companion caster to the 7700-Series Caster Furnished with Rubber Tired, Ball Bearing Wheel

Style No.	Diam. Wheel	Mounting Hole Spacings	Lbs. Cap. Each
3317-5	5"	3" x 6"	500
3317-8	8"	3" x 6"	500





FAULTLESS CUSHION CHAIR GLIDES

FAULTLESS Cushion Chair Glides are made of hardened steel with cushion rubber insert insulation. Rounded corners permit chairs to be moved easily over floors. Drives on the chair with hammer. No holes to drill. Packed 6 sets in a box.

Flexible Cushion Chair Glide

Style No.	Diameter of Base
CNS 078	⅞"
CNS 116	1 1/16"
CNS 114	1¼"
CNS 112	1½"

Cushion Chair Glide Rubber Expansion Sockets

Style No.	Socket No.	Diameter of Base	To Fit Tubing Inside Diameter	To Fit Tubing Outside Diameter
ERS 078	176	⅞"	.527	⅝"
ERS 078	177	⅞"	.652	¾"
ERS 116	179	1 1/16"	.902	1"
ERS 116	192	1 1/16"	.870	1"

Other sockets available for both round and square tubing.

FAULTLESS MEDIUM DUTY RIGID PLATE CASTER

This Faultless Rigid Plate Caster is a companion caster to the 3300-Series Faultless Swivel Plate Caster. The heights are identical with the 3300-Series. It has a full drawn, formed, heavy gauge, steel horn. Furnished with Rubber Tired, Ball Bearing wheel.

Style No.	Diam. Wheel	Mounting Hole Spacings	Lbs. Cap. Each
7717-5	5"	2⅜" x 4"	500
7717-8	8"	4⅛" x 4½"	500



HEYWOOD-WAKEFIELD COMPANY

Heywood-Wakefield • School Furniture Division • Gardner, Mass. and Menominee, Mich.

HEYWOOD-WAKEFIELD EST. 1826

Trim Line

New design simplicity achieves style, comfort and practical convenience with strength to pass the test of time.



3-PIECE FRAME OF 5/8"
tubular steel is lifetime-plated with durable chrome

HIGH BACK FRAME
protects wood back in case chair falls

SOLID NORTHERN BIRCH
is properly seasoned, kiln-dried, finished with finest lacquers

SCIENTIFIC POSTURE RATIO
of seat to back assures proper height and pitch for correct posture

RESISTANCE WELDING
makes joinings stronger than the steel itself

CONTINUOUS BRACING
legs gives extra strength, permits easy stacking

WALL-SAVER LEGS
are splayed to prevent backs from marring walls

SILENT GLIDES
are permanently attached



TABLE DESK

TABLET ARM CHAIR

SLOPING TOP DESK

KNEEHOLE DESK

There is a complete selection of Trim Line furniture in graded sizes for every classroom . . . Write for your copy of the new Heywood-Wakefield School Furniture Catalog.

Heywood-Wakefield • School Furniture Division • Gardner, Mass. and Menominee, Mich.

HOWE FOLDING FURNITURE, INC.

1 Park Avenue, New York 16, N. Y.

Telephone: MUrray Hill 5-5925

America's broadest line of folding tables for schools and universities

Howe folding tables are especially designed for comfortable seating, fast handling and rugged wear. They're light, strong—and practically indestructible. They fold smoothly and take up minimum space when not in use.



HOWE
Square Leg Table

All steel chassis. A brace at each leg for extra strength and a leg at each corner for engineering balance. Riveted and welded throughout. Choice of several different tops and sizes. Ample leg room at both ends and sides.



HOWE
Pedestal Leg Table

All steel chassis with retreating leg fold. Strong, foolproof lock with self-tightening principle. Two separate braces for each pair of legs. Braces are riveted to chassis. Choice of several different tops and sizes. Ample leg room at both ends and sides.



10 SECONDS TO OPEN OR CLOSE
Just press foot on lock, lean forward, bring hands together and your weight folds table. Then fold benches. Entire operation of table and benches is done automatically from one end.



ROOMY
Benches allow for greater seating capacity. Lots of elbow and leg room.



BENCH WITH BACK REST
When table is folded and one bench open, it can be placed against the wall for seating. Comfortable, slanting back rest.

New HOWE Folding Bench and Table Combination



This flexible and multipurpose bench and table combination is wonderful for classroom, cafeteria, gym and many other uses.

RUGGED BATTLESHIP CONSTRUCTION

- Top is ⅞" thick with fir plywood core and 1/16" tan linen plastic on top and bottom. "T" aluminum molding edge around top.
- Benches are 1" thick, hard wood. Taupe finish.
- Legs are 1" heavy gauge steel cadmium plated. Bench legs have metal, mar-proof glides on rubber cushions. Table legs have 3" double ball bearing rubber casters.

Dimensions: Table—30" x 72" x 27" high. Benches—9½" x 72" x 16" high. Folded position—17½" x 72" x 38½" high. Open position—55" wide.



TWO TIER BLEACHER
With table and one bench open it can be placed against the wall and be used as a two tier "bleacher".



NO LIFTING OR LUGGING
Folds compactly and can be moved from place to place with ease. One person can walk away with entire units—they just "float" along.

If it folds— ask HOWE!

THE FORMICA COMPANY

4533 Spring Grove Avenue, Cincinnati 32, Ohio

If every school day they were like this-

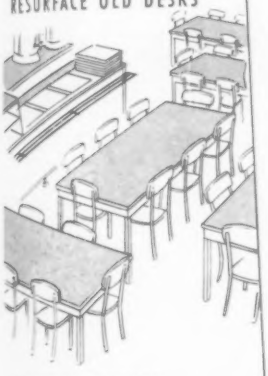


you wouldn't need FORMICA surfaces

but, they're not and you do!



RESURFACE OLD DESKS



CAFETERIA TABLES AND COUNTERS



WINDOW STOOLS

HOME ECONOMIC KITCHENS



WORK TABLES

There is nothing like FORMICA but FORMICA itself

Beautiful rugged Formica is as close to being child-proof as you could ask. It resists scratching and stains of all kinds. Ink, pencil, crayons and just plain dirt wipe off with only a damp cloth.

In ordering new desks and tables specify to the manufacturer that you want Formica tops. Present school furniture can be resurfaced with Formica by regular Formica fabricators or in your own woodworking shops.

Cafeteria tables and counters are ideal for Formica in more than 100 color patterns and wood grains. Home economic kitchens and window stools need Formica for beauty and utility.

Write *Formica for the name of a fabricator near your school or for "on the job" instruction in Formica applications.*
Write FORMICA, 4533 Spring Grove Avenue Cincinnati 32, Ohio

Beauty Bonded FORMICA Reg. U.S. Pat. Off. Pays in Performance

Guaranteed by Good Housekeeping

IRWIN SEATING COMPANY

Grand Rapids, Michigan



Versatile - Practical

POPULAR CHOICE OF CAREFUL PLANNERS

Built for lifetime service, correct posture and perfect adaptability to every modern teaching method, the IRWIN line provides ideal seating for all classroom and auditorium requirements . . . and it is priced to make your budget do maximum duty. Surfaces of desk tops are available in stain and mar-resistant G-E TEXTOLITE — one of many structural superiorities that careful investigation will disclose. Write for complete catalog.

SEATING COMPANY IRWIN GRAND RAPIDS, MICH.

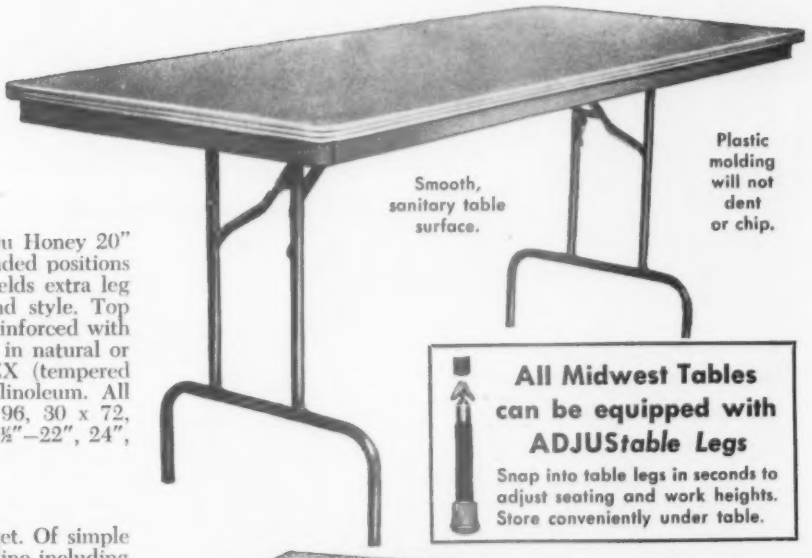
Midwest MIDWEST FOLDING PRODUCTS

Dept. ASU, Roselle, Illinois

First in Quality!
First in Value!

FOLDING TABLES

Midwest's Pedestal Table



Midwest Pedestal Tables feature the exclusive "Du Honey 20" lock that secures legs in both the folded and extended positions automatically. Exclusive "off-center" leg design yields extra leg room at both ends. Round corners add safety and style. Top materials are laminated to stout plywood frame, reinforced with recessed steel apron for perfect rigidity. Available in natural or walnut finish plywood, blond or brown MIDTEX (tempered masonite), General Electric Textolite plastic, or linoleum. All metal parts in taupe baked enamel. Sizes: 30 x 96, 30 x 72, 30 x 60, 36 x 96 and 36 x 72. Standard height: 29½"–22", 24", 26", 28" optional.

All Midwest Tables can be equipped with ADJUStable Legs

Snap into table legs in seconds to adjust seating and work heights. Store conveniently under table.

STANDARD TABLES

A light, sturdy table priced to fit the modest budget. Of simple design, it embodies many features of the pedestal line including . . . exclusive automatic lock, smooth sealed and hot lacquered top. Top is rabbeted into hardwood apron with steel corners for maximum durability. Legs offset to permit comfortable end seating. AVAILABLE IN A COMPLETE RANGE OF SIZES AND TOP MATERIALS.

SQUARE FOLDING TABLES

These highly useful tables are built to the same high quality standards as larger Midwest tables. Features include recessed steel apron, round corners, sanitary plastic molding. Available in ¾" Fir Plywood or Plastic Tops. 30", 33" and 36" square.

ROUND FOLDING TABLES

Solid construction features include the automatic legs that lock in both the folded and extended positions, steel channel reinforcement. Plenty of leg room for seating comfort. Top of Fir Plywood with snug heavy angle steel edge. 60" diameter.

FOLDING BENCHES

Constructed of ¾" fir plywood mounted on rigid recessed steel frame. Smooth finished top and plastic molding protects clothing. Legs are bolted to bench top and spaced for maximum support. Standard width–11". AVAILABLE IN SIX AND EIGHT FOOT LENGTHS.

5-YEAR Guarantee ON ALL MIDWEST FOLDING LEGS

SIMPLIFY MOVING AND STORAGE WITH THESE NEW MIDWEST CHAIR AND TABLE CADDIES!



Midwest offers a complete line of chair Caddies to carry practically all folding chairs manufactured. Adjustable models for handling partial loads and understage model with coupling devices to make a train of Caddies are available.

Table Caddies hold any size folding table. Special "on edge" model available to carry tables on end through narrow halls and doorways. All frames of rolled steel, multiformed for maximum strength and constructed to absorb considerable overload. Smooth action hard rubber caster wheels. Chair Caddies standard 19½" wide, 37" high. Lengths 60", 72", 84", 96", 108", 120". Table Caddies–72" and 96" lengths.



DISTRIBUTORS IN ALL PRINCIPAL CITIES

WRITE FOR COMPLETE LITERATURE!

GENERAL SCHOOL EQUIPMENT COMPANY

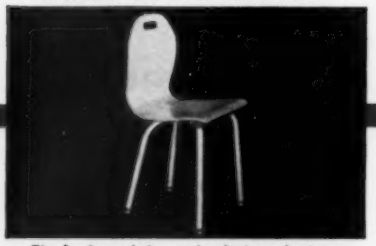
869 Hersey Street, St. Paul 14, Minn.



Proper seating encourages good study habits, keeps young backs straight, and makes work far easier for pupils and teachers alike. Every item in the Bargen-designed line of school equipment by General is built with the specific needs of school personnel in mind.

General Staput-Movable desks inhibit fatigue and encourage comfortable upright posture. Patented Bodytone seats flex with each movement, always retain their proper contour shape. Ruggedly constructed for years and years of daily classroom use. Investigate General's advantages before investing in any kind of classroom furniture.

WRITE FOR LITERATURE



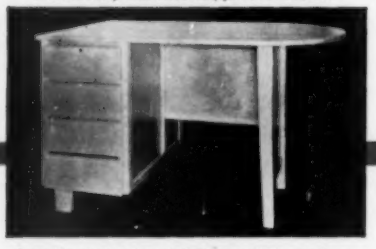
The Academy chair...senior, junior or bantam



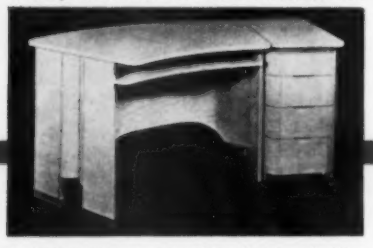
Academy tablet arm chair... with or without book box



Soliform table desk...new addition to the Staput series



Consulter desk solves student consultation problem



Teacher's conference unit combines beauty and utility



The finest in functional, flexible class arrangements

General

featuring the designs of William James Bargen

SCHOOL EQUIPMENT COMPANY

869 HERSEY STREET, ST. PAUL 14, MINN.

NORCOR MANUFACTURING COMPANY, INC.

Green Bay, Wisconsin

NORCOR SCHOOL FURNITURE and INSTITUTIONAL SEATING . . . *sets the Standard for Quality*

"Norcor or equal." These words are found more and more frequently in specifications from school boards and institutions around the country, as Norcor's inherent quality of construction and design become more widely recognized.

This is school furniture that is designed to fit growing children! It has comfort and good posture built into it, as well as the strength and stamina needed for years of hard classroom usage, without sacrificing the ready mobility required with modern educational techniques.

For sound quality and design—in school furniture or folding chairs—always specify Norcor!



NORCOR TUBULAR CHAIR DESK

Built with a sturdy tubular steel frame with welded stretchers and book rack, this chair will not rack or twist. The seat is form-fitting, resin-bonded, clear-faced plywood, as are the back-rest and desk-top.

This Norcor Tubular Chair is made in 17" and 18" seat heights, and its 20" x 28" desk top provides ample working surface. The Norcor Tubular Chair Desk combines the convenience and compact construction of a tablet arm chair with the working surface of a separate desk and chair.



NORCOR 300 Series FOLDING CHAIRS

The Norcor 300 was expressly designed for institutional use and is the safest, sturdiest and most comfortable folding chair built today.

Built of strong, seam-welded, tubular steel, with radially-welded tubular steel stretchers, the Norcor 300 will stand up under the most severe punishment. The big, roomy, form-fitting seat offers "arm-chair" comfort for the largest, normally built persons as well as the slightest. It is self-leveling, and designed not to collapse, even with weight concentrated on the extreme front or back of seat. No finger pinching, clothes snagging linkage is used in the folding mechanism, the hinge is covered for protection. For stacking and storage, the Norcor is designed to "nest" perfectly.

Available with steel, plywood, upholstered seats and steel or upholstered back rest, in a wide range of colors.



NORCOR TUBULAR DESK AND CHAIR

LIFT TOP OR OPEN FRONT—
PLYWOOD OR SOLID WOOD CONSTRUCTION

Strong and sturdy, but light in weight,—scientifically designed for maximum comfort with correct, alert, classroom posture, Norcor Tubular Desks and Chairs have been tested and proved in thousands of classrooms all over the country. They provide the flexibility required in modern classroom practices, and are easily moved for group projects, so that the flat table tops provide a large work surface.

Norcor Tubular Desks and Chairs are made in a complete range of sizes to provide comfort and proper, alert posture to all pupils from kindergarten through college.



NORCOR Series 180 FOLDING CHAIRS

The famous Norcor 180 is being used by schools and institutions of all kinds all over the world. No other folding chair offers as many quality and design features at so moderate a cost. Ruggedly built with a double beaded channel steel for long hard service, yet it can be handled with utmost ease, and opens and closes with a single motion. Extremely compact, when folded it occupies a depth of only one inch.

The strong, welded frame construction prevents racking and twisting, and the chair is so designed that it will not collapse even with weight on front or back of seat.

The Norcor 180 is available with steel, steel trimmed plywood or Spanish Leatherette upholstered seat and with form-fitting steel or upholstered back rest in a wide choice of colors.

Shown here are only a few items of the complete, quality-built, NORCOR Line of school furniture and institutional seating. Write today for complete catalogs and name of nearest distributor. Our representatives will be glad to consult with you on your seating requirements.

The NORCOR *Line*

THE NORCOR MANUFACTURING COMPANY, INC.
Dept. AS, GREEN BAY, WIS. • PORTSMOUTH, N. H.

MITCHELL MANUFACTURING CO.

2772 S. 34th Street, Milwaukee 46, Wisconsin

for CHANGING ROOM USES



GENUINE *Mitchell* FOLD-O-LEG *tables*

LEGS FOLD UNDER FOR STORAGE

GENUINE MITCHELL FOLD-O-LEG TABLES

THE STRONGEST, HANDIEST, FOLDING TABLES MADE!

CONSTRUCTION FEATURES: Smooth, clean, sanitary tops unmarred by rivets, nails or screws. Tops completely reinforced by ¾" plywood underframe to eliminate weakness and flexibility. Strong welded steel channel apron reinforces top and underframe for greater rigidity. Table top edges protected with Beige colored plastic moulding which absorbs shocks without denting or splintering. New combination LEVEL-STACK corner plate and rounded corner keeps tables level and steady when stacked by preventing corners from meshing. Rounded corner adds safety. Tubular Steel Leg assemblies thoroughly welded into one strong unit. Proper pedestal arch width prevents tipping. Legs equipped with steel floor glides. All metal parts finished in a pleasing Bryce Beige colored enamel. Extra-heavy steel patented jackknife folding brace eliminates rattle, end play and wobble. Simple strong compression lock easily operated with one hand.

All tables made 29" high for adult use. 22", 24" or 27" heights can be furnished for children or older youth groups.

Exclusive Patented Features give MORE: Seating Capacity, Leg Comfort, Strength, Rigidity, Long Life and Service . . .

STANDARD FOLD-O-LEG TABLES

Size	Masonite Presdwood Tops Model No.	Birch Plywood Tops Model No.	Fir Plywood Tops Model No.	Resilyte Tops Model No.	Formica Tops Model No.	Linoleum Tops Model No.
96" L. x 30" W.	VM-1	B-1	F-1	R-1	P-1	L-1
72" L. x 30" W.	VM-3	B-3	F-3	R-3	P-3	L-3
60" L. x 30" W.	VM-4	B-4	F-4	R-4	P-4	L-4
96" L. x 36" W.	VM-9	B-9	F-9	R-9	P-9	L-9
72" L. x 36" W.	VM-11	B-11	F-11	R-11	P-11	L-11
48" L. x 30" W.	VM-19	B-19	F-19	R-19	P-19	L-19

SPECIAL FOLD-O-LEG TABLES

36" L. x 36" W.	VM-20	B-20	F-20	R-20	P-20	L-20
48" L. x 30" W.	VM-21	B-21	F-21	R-21	P-21	L-21
36" L. x 30" W.	VM-23	B-23	F-23	R-23	P-23	L-23

ABOVE SPECIAL TABLES MADE WITH "U" TYPE LEGS

"VM" models have the NEW "QUALITE" Light-tone Masonite Tops; these light-finished tops are most popular for school use.



KINDERGARTEN TABLES

Made in the same top sizes as standard FOLD-O-LEG Tables but in 22" heights, also in 24" and 27" heights for bigger children. Leg extensions easily convert these tables to regular 29" height for adult use.

ROUND FOLD-O-LEG TABLES

Made with ¾" 5-ply Fir tops, natural varnish finish, protected with plastic edge moulding. Also made with other tops. Continuous steel apron 1½" deep. Tubular steel legs fold into recess formed by apron. All metal parts finished in durable Light Bryce Beige enamel.

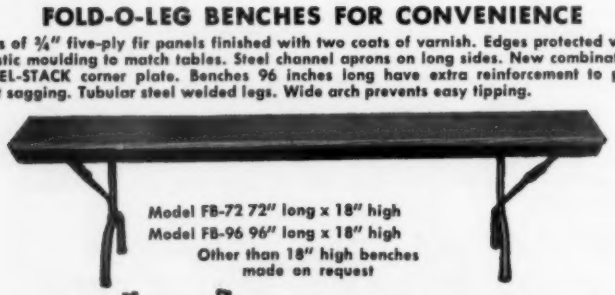


FIR PLYWOOD TOPS

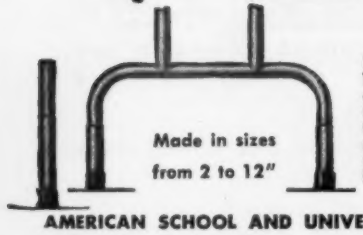
SIZE	MODEL NO.
48" round x 29" high	RF-12
60" round x 29" high	RF-13

FOLD-O-LEG BENCHES FOR CONVENIENCE

Tops of ¾" five-ply fir panels finished with two coats of varnish. Edges protected with plastic moulding to match tables. Steel channel aprons on long sides. New combination LEVEL-STACK corner plate. Benches 96 inches long have extra reinforcement to prevent sagging. Tubular steel welded legs. Wide arch prevents easy tipping.



Model FB-72 72" long x 18" high
Model FB-96 96" long x 18" high
Other than 18" high benches made on request



Made in sizes from 2 to 12"

LEG EXTENSIONS

Provide additional uses for FOLD-O-LEG TABLES. Kindergarten tables can be raised to regular 29" height, regular height tables can be extended to counter height for crafts or exhibit purposes. Patented expansion lock gives strong, secure connection. Easily removed. Including Rubber tips

TABLE TRUCK SAVES TIME AND LABOR

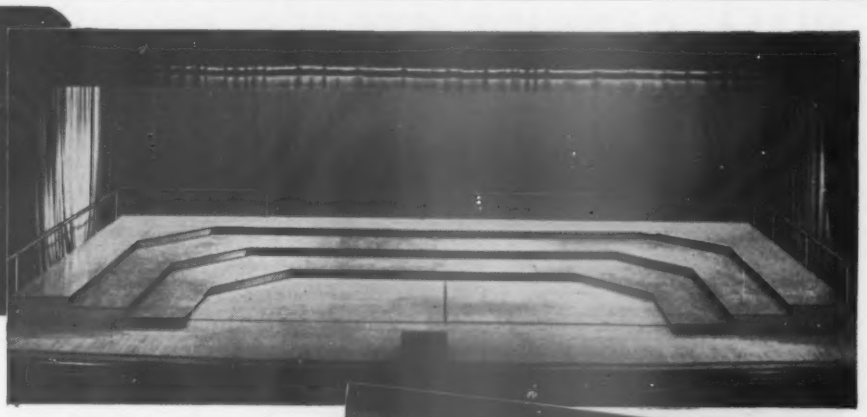
Easily carries 12 standard folding tables stacked on top of each other. Made of 1⅝" O.D. high carbon steel tubing, strongly welded and nicely finished in Bryce Beige enamel. 5" x $1\frac{5}{16}$" rubber tired wheels with self-lubricating bearings assure quiet and easy operation . . . two wheels swiveled for short radius turning. Frame length 76", width 26" with removable handle.



Model No. T-34

MITCHELL MANUFACTURING CO.

Mitchell PORTABLE FOLDING STANDS



EASY TO SET-UP
1, 2, 3 or MORE LEVELS
for BAND, ORCHESTRA, CHORAL and DRAMATIC GROUPS

Sturdy, safe, easy to handle units with strong tubular steel folding legs, ¾", 5 ply Fir plywood tops reinforced with a steel channel apron for greater strength and rigidity. Standard top size of one unit is 4′ x 8′. Units are made in heights starting with 8" and increasing by 8′ rises to form step-like arrangements as shown in the photographs.

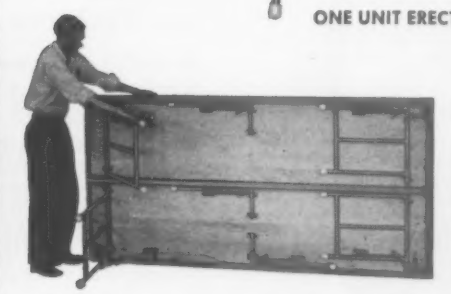
A complete Band Stand for 120 piece band can be stacked and stored in a space 4′ wide, 8′ long and 6′ high.

All genuine Mitchell products have: extra strong welded tubular steel leg assemblies and simple foolproof folding features.

They last longer because they are built stronger.







LEGS FOLD UNDER FOR EASY AND COMPACT STORAGE

Bottom view shows how easily these units can be handled by one person. Legs fold flat against underside of top and do not extend below apron. This allows flat stacking one on top of the other for minimum storage.

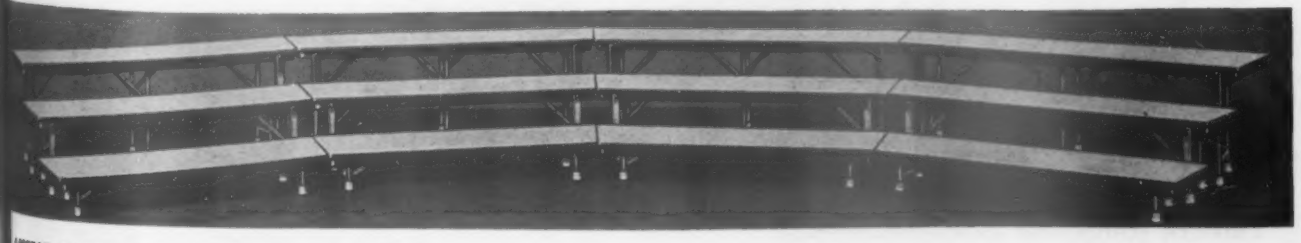
MITCHELL ONE-LEVEL STANDS

Photograph above shows a one-level platform set-up in a gymnasium. This type of installation has real flexibility of arrangement because the standard 4′ x 4′ units can be set-up as a complete platform to accomodate groups or a few units used as speakers platforms, runways etc. The portability of these units and the ease with which they can be set up or removed and stored in minimum space, have made them most popular and most practical for school, church, hotel, lodge and many public and private uses.

MITCHELL *Portable* CHORAL STANDS

The complete Choral Stand for a standing group, as shown below, is composed of four sections, like the one shown to the right. Each section is three elevations high and of tapered design to produce the semi-circular stepped-up arrangement so popular for Choral Group performances. These units for standing groups have 18" wide tops. Each elevation has a rise of 8" above the other, the first being 8" above the floor. Units and sections lock and clamp together for safety and extra rigidity. Units for seated groups are made with 36" wide tops. Both standing and seated group choral stands are also available in four elevations.





MITCHELL MANUFACTURING CO.

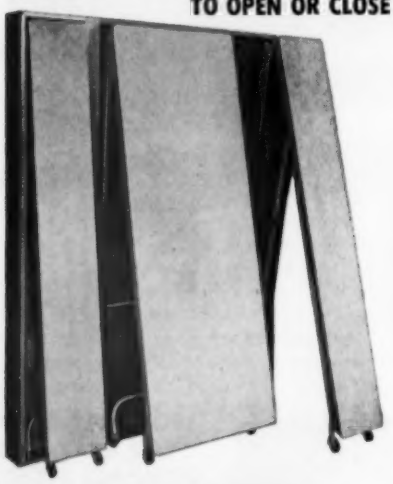
WALL CABINET STORED *PORTABLE FOLDING* TABLES & BENCHES



EASY AND SAFE
TO OPEN OR CLOSE

Mitchell FOLD·O·LEG *Doubler*





DOUBLE - USE
Detached from cabinet, *rolled anywhere.*
Left attached, *quick use and removal.*

DOUBLE - QUICK
Change room use in minutes.

DOUBLE - DUTY
Cafeteria, banquet, classroom, meeting.

DOUBLE - CAPACITY
Seats 20 children or 18 adults.

DOUBLE - SAFE, SANITARY
Folding tops have center gap to prevent hand injury. Easier to keep clean.

DOUBLE - DURABLE
Built better, last longer.

Mitchell's advanced design and construction features assure utmost safety, dependable, easy operation, long trouble-free service with minimum upkeep. DOUBLER TABLES and BENCHES are made with tops of Linoleum, Resilyte or Formica plastics in many patterns and colors. All tops have round corners with all edges protected with a tough, tight-fitting, dent-resistant Beige colored plastic moulding. Tops are reinforced with full-length steel channel aprons for maximum rigidity. Tops rest directly on the full-width upper cross-bar of the tubular steel leg assemblies for added support and load capacity. Easy-to-operate, keyless locks hold units securely in the wall cabinet. Cabinet is all steel with enclosed back. All metal parts including cabinet completely finished with long-wearing Light Bryce Beige colored enamel.

Wall cabinet, outside dimensions	7'2" high, 5'4" wide, 6½" deep
Doubler Table	13'10" long, 30" wide, 29" high
Doubler Benches	13'10" long, 12" wide, 18" high

Cabinet with table only or double depth cabinet with two tables and four benches or other table and bench heights for recessed-in-wall or against-wall installation.



USE ATTACHED
OR DETACHED
FROM CABINET

SIMPLE, STRONG EASY FOLDING

Nothing complicated about MITCHELL'S Folding Mechanism, it has fewer parts to interfere with comfortable seating or to get out of order . . . MITCHELL'S construction gives greater rigidity in use plus foolproof, easy operation.

PATS. PEND.



E. W. A. ROWLES CO.

Manufacturers of School Equipment, Classroom Seating and School Furniture

Arlington Heights, Illinois

CLASSROOM SEATING & SCHOOL FURNITURE





It Stacks!

Rowles SPACE-MASTER DESK & CHAIR UNIT

A new idea in classroom seating. Combines all the fine features of good classroom seating with a modular design that enables the desks and the chairs to be "stacked" and stored in a corner or against the wall. Provides a practical way to clear the classrooms, and store the chair and desks so that the room may be used for other purposes. A very flexible unit with unlimited applications.



Rowles MODERNAIRE CHAIR DESK

A beautiful streamlined design combined with superb construction features make this an outstanding value in classroom seating. An exceptionally strong unit with one-piece side frames welded to cross members. Modern styling, comfortable and made to last for years and years. Designed to encourage better posture control and assurance of day-long comfort. Large writing surface with adjustable height.



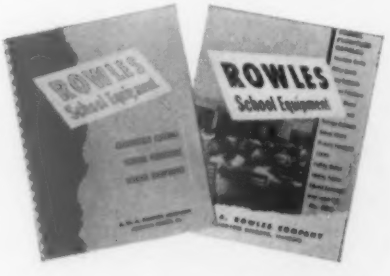
Rowles MASTERMADE DELUXE MOVABLE DESK

Everything you could ask for in good classroom seating. Beauty, style, durability, good posture control, big book box, large over-size writing surface, swivel seat, lift lid. All these plus many new improved features make the MASTERMADE DELUXE DESK the kind of a desk that you've always been looking for.

Rowles SCHOOL FURNITURE

Rowles offers a complete line of classroom seating, school equipment, school furniture, library equipment, office desks, tables, chairs, file cabinets, folding chairs, teachers desks, primary equipment, cabinets, etc.

See your local ROWLES SCHOOL EQUIPMENT DEALER



ROWLES
School Equipment

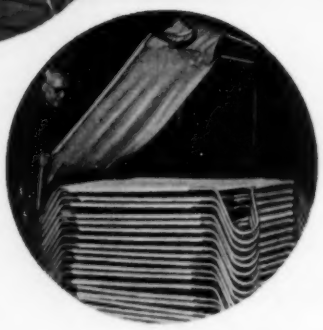
Ask your local Rowles School Equipment Dealer for a copy of these two new Rowles Catalogs showing the complete line of Rowles Classroom Seating and Rowles School Furniture.

E. W. A. ROWLES COMPANY
ARLINGTON HEIGHTS, ILLINOIS

SCHOOL INTERIORS CO., INC.

5 University Place, New York 3, N. Y. • 316 N. Michigan Avenue, Chicago, Ill.





SCHOOL INTERIORS CO. is proud of being **FIRST . . .**

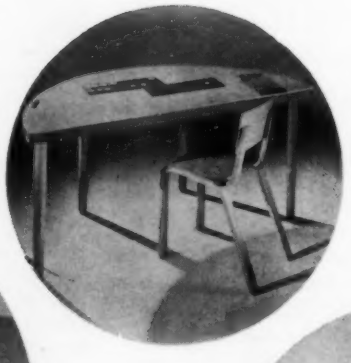
to pioneer modern functional flexible classroom furniture . . .

to keep pace with curriculum needs and architectural changes in building programs.

All units—tables, chairs, cots, storage units—are designed to meet the special needs of young children in an *early childhood education curriculum.*

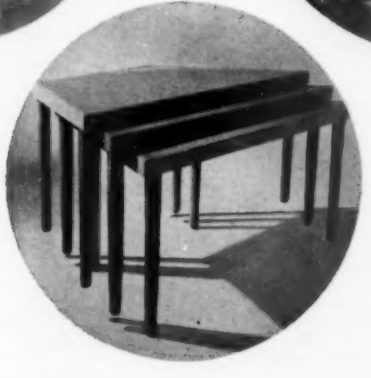
school interiors co., inc.

Early childhood specialists pioneering in stacking multi-functional furniture.









SEATS & DESKS, INC.

218 So. Wabash Ave., Chicago 4, Illinois

NEW HORIZONS

in QUALITY–SERVICE–ECONOMY



FEATURES:

1- "SAFETY" CHAIRS . . . design minimizes tipping backward.

2- "WALL-SAVER" feature of chairs eliminates wall marks and scratches.

3- Desks may be either open front or lifting lid. Top may be solid maple, plywood or plastic.

4- Seats and backs of "SAFETY" chairs either hardwood, plywood or solid maple.

5- Toughest wood and metal finishes.

6- Cost economies that s-t-r-e-t-c-h your budget.

MANY OTHER POPULAR SCHOOL FURNITURE ITEMS AVAILABLE

Write for Complete Specifications Before You Buy School Furniture

DISTRIBUTORS IN PRINCIPAL AREAS

WILLIAMS AND BROWER, INC.

Siler City, North Carolina

Well Built MODERN SCHOOL FURNITURE Designed for UTILITY — — SERVICE



No. 4230-S SINGLE PEDESTAL DESK

Top: 42 x 30". 1¼" thick with edges banded.

Height: 30"

Drawers: Fronts, veneered 13/16" thick. Dove tailed front and rear. Hardwood veneer interior, with full framed-in bottoms, finished inside. Key lock in knee drawer, controlling all metal locking devices.

Legs: 1¾" square, selected hardwood, tapered and fitted with ferrules.

Made of Oak or Maple.

Full mortise and tenon construction, with molding around bottom of panels. Frame reinforced at lower rear corners with steel corner tenons.

Also available: Double-pedestal desk with top sizes of 54 x 30 and 60 x 34; secretarial desk 60 x 34.

NO. 400 TABLET ARM CHAIR

Seat: 18½" wide x 17" deep

Tablet Arm: 23½" long x 12½" wide

In Beech or Oak with Beech Tablet

Finish: Natural, School Brown or Warmtone

Exceptionally comfortable and serviceable



NO. 617 MOVABLE CHAIR DESK



These Movable Chair Desks are made in three heights and sizes: No. 613—13" seat height; No. 615—15" seat height; No. 617—17" seat height.

NO. 1400 CHAIR



No. 1400 chairs have full saddled seats, double dowelled throughout. Of thoroughly kiln dried Beech, in Natural, School Brown, or Warmtone Sizes: 10" through 18"

NO. 1400 DESK AND CHAIR UNIT

All No. 1400 Chairs, Movable Chair Desks, and Tablet Arm Chairs have special lock-joint corner block construction

No. 1400 units are made in four standard sizes:

A Size: Desk 29" and Chair 17"

B Size: Desk 26" and Chair 15"

C Size: Desk 23" and Chair 13"

D Size: Desk 22" and Chair 12"

All 1400 desks have 18" x 24" tops with a 4½" book compartment. Pencil grooves are standard equipment. Both desks and chairs are designed for maximum comfort, appearance and service.

Made from Beech lumber, thoroughly kiln dried and finished either in Natural, School Brown or Warmtone.



W & B WELL BUILT

WRITE FOR NAME OF AUTHORIZED DISTRIBUTOR IN YOUR STATE

Art Metal
serves the educator . . .



Art Metal 2100 Line Book Units in the curriculum library at the Fort Hays Kansas State Library, Hays, Kansas

This Wide Range of Art Metal Book Units Meets Budget Requirements

The 2100 Line of Art Metal Book Units are neat and substantial in appearance, and may be used anywhere that open book storage is suitable.

They are offered in both single and double faced styles and in three heights: 42" high units with 2 adjustable shelves; 84" and 90" high units with six adjustable shelves. Each book unit is shipped completely assembled ready to be set in place. Write for the Art Metal 2100 Line Book Unit Catalog for complete details.

This stock line development is based on Art Metal's 66 years of experience as a leader in the field of built-to-order library book stacks and equipment. Architects and school executives are invited to consult the Art Metal planning staff for methods to meet modern requirements of appearance, efficiency, and durable service. Write to the Art Metal School Equipment Division, Jamestown, New York.



Style 2118 book unit with detachable finished end panel.

Detachable finished end panel for single or double faced units.

Style 2118 book unit without finished end panel. Used for addition to original unit.

Overall unit sizes: 9 15/16" deep (single face), 19 7/8" deep (double faced) and 36" wide. Clear shelf size is 34 5/16" W., 9" deep. Opening behind shelves increases book space to 9 3/4".



Style 2114 counter-height book unit with detachable finished end panels. (equipped with sloping base shelf.)

ART METAL CONSTRUCTION CO.,

JAMESTOWN, N. Y.



For Classrooms

ART METAL TEACHERS' DESKS AND CHAIRS

For the finest desks and chairs made, choose from the complete Art Metal lines for executives, teachers and all other desk workers. Art Metal "Work Planned" desks have everything the modern classroom and office demands in good appearance, resistance to hard use, and convenience, with many extras found in no other desks. Art Metal "Correct Seating" Aluminum Office Chairs blend smart styling with exclusive Art Metal comfort features. They increase the efficiency and morale of teachers and others by reducing fatigue through correct seating. For other office chairs ask for catalog.



No. 703 Swivel Chair
Reduces fatigue, increases working efficiency. Seat 17½" W. by 16¼" D., height adjust. 17" to 20⅜".



No. 764 Utility Chair (Wallsaver)
Rear legs designed to prevent the top of chair back from hitting wall. Seat 16¼" W., 16¼" D., 17¾" H. Overall height is 32⅝".

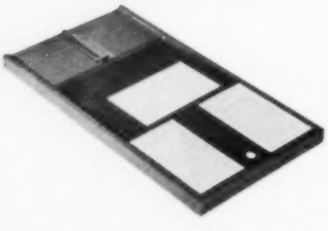
ART METAL TEACHERS' DESK, STYLE 1555FBR



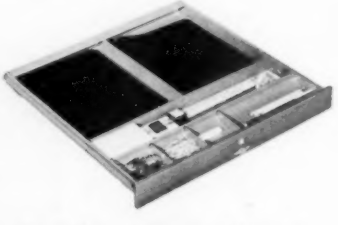
55" wide, 29" high, 30" deep. Front view (left) and rear view (right). Designed with end overhang for pupil conference, and many other special features developed as a result of a survey of teachers' requirements.



OPTIONAL DRAWER EQUIPMENT FOR ART METAL TEACHERS' DESK



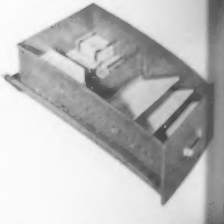
Glass Covered Reference Slide for class schedule, reports, lists or other often-needed data.



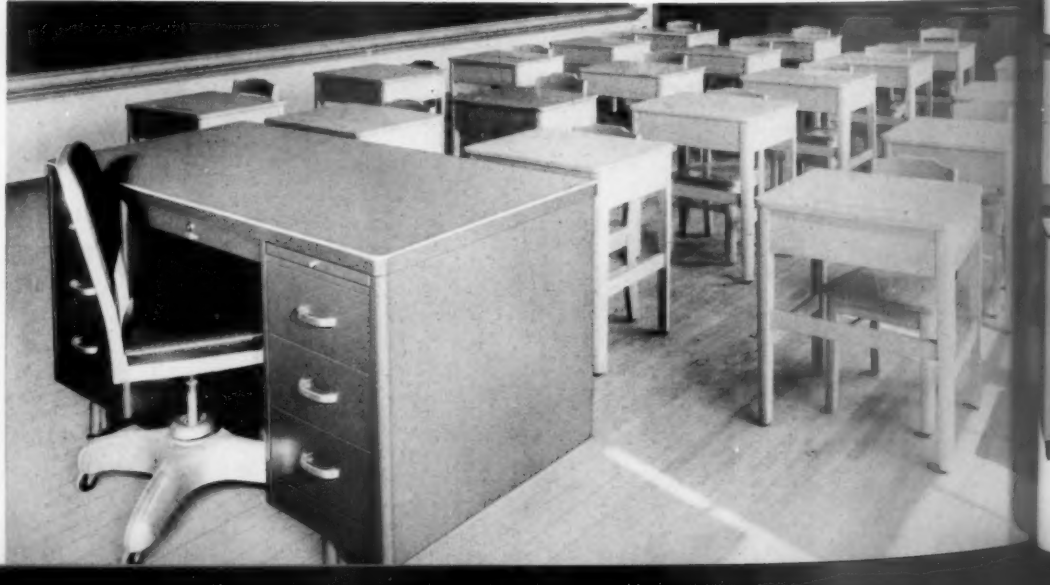
Knee Space Drawer with extra compartments and rear sections for visible index and loose-leaf binders.



Vertical File Drawer—with two letter-size cross file trays, indexed if desired, for pupil records, etc.



Box Drawer with three adjustable sloping partitions and removable vertical partition.



The Art Metal Teacher's Desk in a typical elementary classroom. The double pedestal desk shown, Style 1555FB, provides drawer capacity equivalent to a standard two drawer file and still has two regular size box drawers which may be used for active and convenient storage of required classroom materials. The back of the desk is recessed to permit kneespace for students who confer with the teacher.

For Administrative Offices

FILES and COUNTER EQUIPMENT

There is an Art Metal File to meet every school office need in 2, 3, 4 or 5 drawer heights, for every standard size of record. A wide range of card record files provide for the varied sizes of pupil records which are required in most school administrative offices.

The use of Art Metal stock equipment offers an economical solution to many school installation problems. Because Art Metal equipment is standardized, "custom-type" arrangements can be designed in many combinations for the office without the need of special, more expensive contract work. Standard letter and legal drawer and card record files, Widesections, Halfsections and substitute drawer inserts permit the utmost in flexibility of arrangement.

ART METAL FILING CABINETS



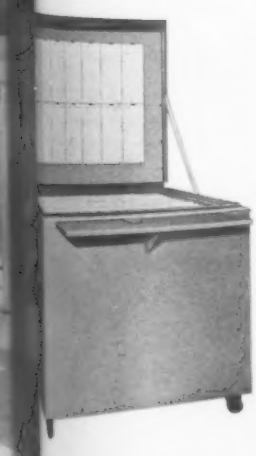
Style 43417
Drawer Letter File,
W., 41 3/16 H.,
D.

Style 7441
5 Drawer Letter File,
14 15/16 W., 58 1/2 H.,
28 7/16 D.

Style 7641
4 Drawer Letter File
14 15/16 W., 51 13/16 H.,
28 7/16 D.

Style 7341
2 Drawer Letter File
14 15/16 W., 30 5/16 H.
28 7/16 D.

ART METAL CONSTRUCTION CO., JAMESTOWN, N. Y.



ART METAL PLANFILES

The Superintendent of Buildings and Grounds will find the Art Metal Planfile ideal for filing of drawings, tracings and blueprints of school properties. The large number of plans often required by a school plant must be filed for easy reference by authorized persons and for protection against destructive elements. The Art Metal Planfile provides for these requirements by its simple filing system and special construction. And by keeping all drawings in perfect condition, and in order while filed, a Planfile quickly pays for itself by preventing lost, mislaid or damaged drawings that could easily cost more than Planfile to be redrawn. Art Metal Planfiles are available in four sizes, for drawings up to 56" wide.



This administration office is typical of the way Art Metal products meet the functional requirements of the school and college. Illustrated is a principal's office equipped with an Art Metal New Century Desk and Aluminum Office Chairs.

The librarian's desk shown below provides drawer space for filing check-out cards as well as temporary storage of returned books. Art Metal also furnishes commercial departments with typist's desks giving students the chance to use modern office desks before graduation.



An Art Metal Widesection Unit is also shown as used in a school library. It has a filing capacity of over 18,000 catalog index cards. Many other filing combinations can be assembled from Art Metal Widesections and Halfsections.

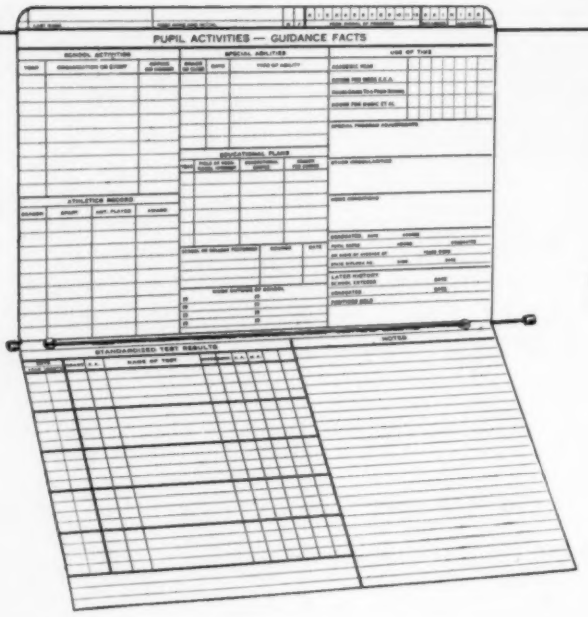
For Simplified Record Keeping

Art Metal
Jamestown, New York
U·S·A

POSTINDEX "VISIBLE INDEX" FILES

STUDENT HISTORY
STUDENT HEALTH
DENTAL CARE
PHYSICAL EDUCATION
PERSONNEL
ADMINISTRATIVE
PURCHASING
STOCK CONTROL

• Send for our 32-page, "Modern Records for Schools," describing 23 records used in schools and colleges today.

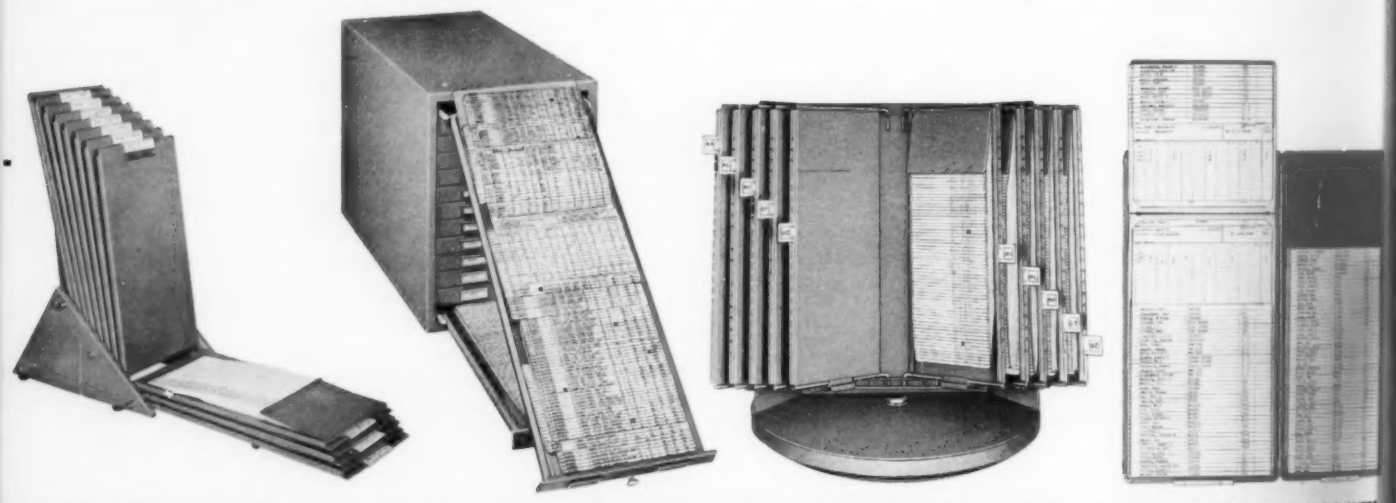


POSTINDEX "VISIBLE INDEX" FILES . . .

Visible Margins . . . the fastest means of reference ever developed.

4 Sides to Write On . . . for easy, rapid postings of records while they are current. An economy feature too.

Trunnion Wire Holder . . . snaps in, snaps out . . . the most flexible, fast, efficient means of adding, removing, or rearranging records.



POSTINDEX RAPID STACK • MODEL 8 DRAWER CABINET • ROTARY PROGRAM STAND • FLAT BOOK WITH POCKETS

POSTINDEX RAPID STACK — The fastest posting equipment available for jobs requiring exceptional speed . . . left hand "spots" the facts and does all the handling. Right hand is always free for posting. Records in vertical position . . . out of the way when not in use. Panels lift out and can be replaced instantly. Complete portability.

MODEL 8-DRAWER CABINET — Generally accepted as standard equipment for schools, the cabinets are made in seven styles: Standard, Deep Drawer, Extra Deep Drawer, Shallow Drawer, Hinge-Clip, Pocket Holder, Duplex—each designed to meet a wide range of specific needs. Available in capacities ranging from 500 to 2,500 records. Cabinets made in units of 7, 9, 12, 13, 18 and 20 drawers and a wide variety of card sizes. New improved slide suspensions.

ROTARY PROGRAM STAND — Provides for visible indexing of each pupil's daily program. Every record quickly, easily available. Each panel is doubly indexed and can be removed individually. Mounted on rotating base for easy reference to records from either side of a desk or counter.

FLAT BOOK WITH POCKETS — For frequent use by more than one person, Flat Books prove exceptionally valuable. Single Books are compact, fully protected, portable units. Existing card installations can be transferred to the Postindex way using pockets for 5 x 3, 6 x 4, and 8 x 5 cards. Capacities range from 64 to 240 records.

Flat-Books available for standard forms or cards from 3⅞" x 3" to 12" x 6".

FOR FURTHER INFORMATION ABOUT POSTINDEX SCHOOL RECORDS, WRITE:

POSTINDEX DIVISION ART METAL CONSTRUCTION COMPANY, JAMESTOWN, N. Y.

ART METAL CONSTRUCTION CO., JAMESTOWN, N. Y.

— BRANCH OFFICES —

BALTIMORE, BOSTON, CHICAGO, CINCINNATI, DETROIT, HARTFORD, LOS ANGELES, NEWARK, NEW YORK, PHILADELPHIA, PITTSBURGH, WASHINGTON, D. C.

DEALERS COAST TO COAST

D-5/Fe

NEW

TWO GREAT LOCK BOXES!

COMBINATION OPERATED AND KEY OPERATED





Key Type Box

- Finest Of Pin Tumbler Locks
- Rugged Construction
- May Be Keyed Into Room Lock System
- Complete Key Replacement Service

Combination Type Box

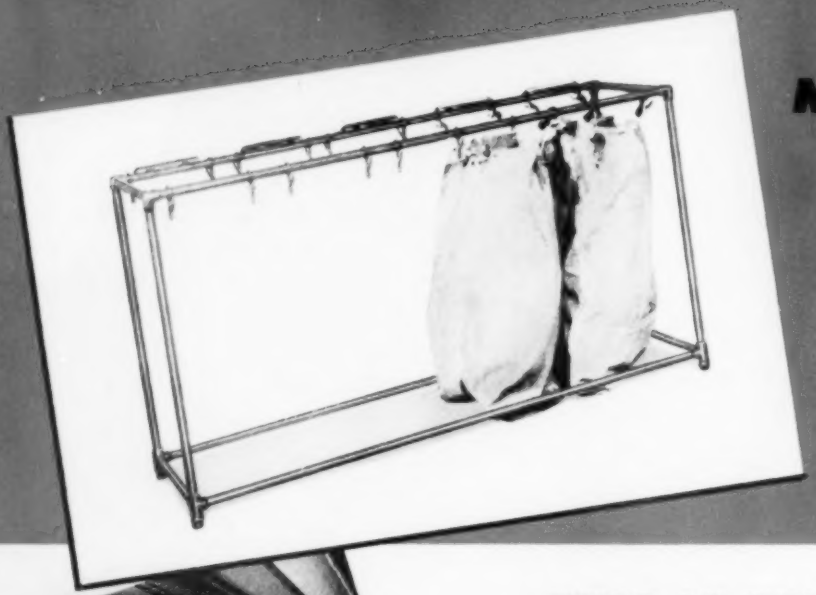
- Preferred by U.S. Post Office Department
- Simple Lock Design
- Easy to Change Combinations
- Rugged Construction
- Proven By Years Of Service
- Available In Bronze Or White Finish

FREE LAYOUT SERVICES AND CATALOGUE . . . WRITE TODAY!

MANUFACTURERS OF POST OFFICE EQUIPMENT

THE FEDERAL EQUIPMENT CO.

CARLISLE, PENNSYLVANIA



MAIL BAG RACKS

MAKE A TOUGH JOB EASY . . . USE FEDERAL BAG RACKS!

Use a Federal Bag Rack. Set up a sack for each destination . . . toss mail into sack . . . pull and fasten ties. It's ready to go! Racks are built for Standard or Special Sacks.



THIS IS FEDERAL . . .

Half a century's production of highest quality products has given Federal a reputation as the Manufacturer of the best in Post Office and General Office Equipment.

The newest Techniques, Machines and Materials are combined with the worker's pride in his task to produce fine products in wood and modern metals.

Located close to abundant sources of raw material (wood or metal) and fast carriers to all sections of the country Federal is confident of its ability to give superior quality at most favorable prices.

A FEW OF THE MANY WE SERVE

- U.S. Post Office Department
- U.S. Artillery School
- University of Maryland
- University of Virginia
- University of Tennessee
- University of Texas
- University of Georgia
- University of Nebraska
- Pittsburgh Xenia Seminary
- Dominican School of Nursing
- John Carroll University
- Bennett College
- Idaho State College
- Indiana S.T.C. (Pa.)
- Mansfield S.T.C. (Pa.)
- Susquehanna University
- Pennsylvania State University
- Hill School
- Shippensburg S.T.C. (Pa.)
- Dickinson College

WITHOUT OBLIGATION WE WILL PLAN YOUR MAIL ROOM . . . WRITE US TODAY!

MANUFACTURERS OF POST OFFICE EQUIPMENT, SPECIAL FURNITURE AND LOCKERS

THE FEDERAL EQUIPMENT CO.

CARLISLE, PENNSYLVANIA

GENERAL FIREPROOFING

GF

REG. U. S. PAT. OFFICE

metal furniture

CHAIRS
TABLES
DESKS
FILES
COUNTERS
CABINETS
SHELVING
SPECIAL EQUIPMENT



offices, lobbies, dining rooms, cafeterias, restrooms, classrooms, libraries, laboratories, other areas in public and private buildings—hotels, hospitals, banks, schools, clubs, courthouses, institutions, and business places.

ENERAL FIREPROOFING COMPANY

YOUNGSTOWN 1, OHIO

Printed in U.S.A.

Form No. 170M755

Goodform ALUMINUM

REG. U.S. PAT. OFF.



No. 3507
Goodform Comfort Master DeLuxe

ADJUSTABLE OFFICE CHAIRS

Style, comfort and utility are outstanding in Goodform aluminum adjustable chairs. Seven models from Comfort Master DeLuxe to Secretarial No. 2123 provide seated comfort for every worker—president to typist.

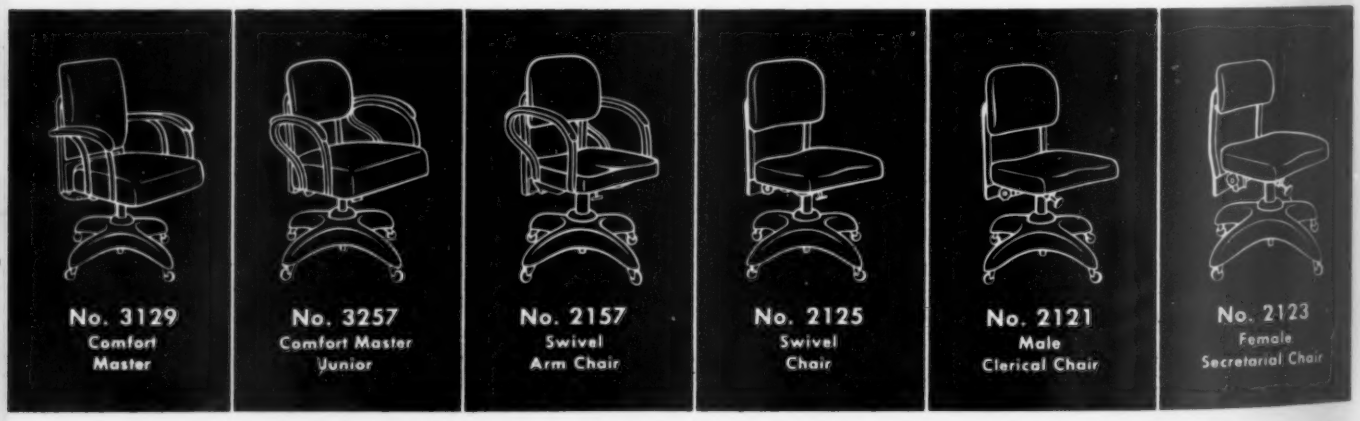
Colors to meet decorative requirements are readily available. You have a wide choice of upholstery fabrics. Standard finish is anodized natural aluminum. Color anodized finishes in gold, ebony and other hues are available.

Comfort is assured by five adjustments on each chair which fit it to the individual needs of the user. Seats and backs are cushioned with foam rubber.

Welded, heat treated aluminum frames are light weight, fire resistant, rigid and strong. The extremely hard anodized finish does not scratch or mar easily and is simple to clean. Hundreds of Goodform adjustable chairs made over 20 years ago are still serviceable and good looking.

Also available are companion chairs to go with adjustable models and non-adjustable swivel chairs.

Comfortable, lightweight, adjustable chairs for all office workers



No. 3129 Comfort Master

No. 3257 Comfort Master Junior

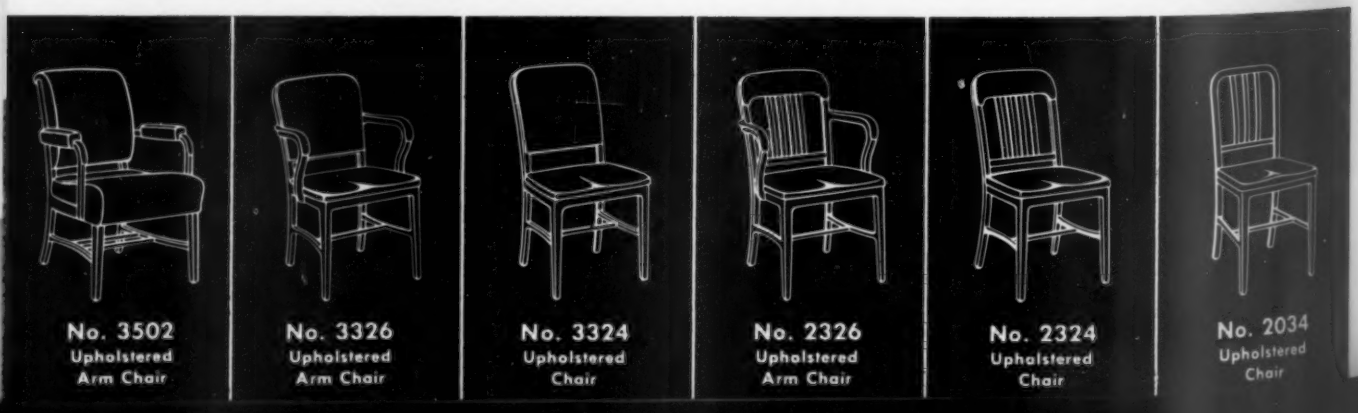
No. 2157 Swivel Arm Chair

No. 2125 Swivel Chair

No. 2121 Male Clerical Chair

No. 2123 Female Secretarial Chair

Attractive companion chairs of easy-to-clean aluminum



No. 3502 Upholstered Arm Chair

No. 3326 Upholstered Arm Chair

No. 3324 Upholstered Chair

No. 2326 Upholstered Arm Chair

No. 2324 Upholstered Chair

No. 2034 Upholstered Chair

CHAIRS AND TABLES

INSTITUTIONAL FURNITURE

Goodform aluminum institutional chairs and tables are ideal for restaurants, cafeterias, dining rooms, meeting rooms, ballrooms and other areas—in hotels, hospitals, schools, libraries and institutions both public and private.

Color anodized aluminum finishes, set off by colorful upholstery fabrics, help the decorator use these chairs to carry out effects of unusual individuality, smartness and distinction. From a utility angle, these chairs are fire-resistant, light to handle and inexpensive to clean. They retain their beauty for years.

Many styles are available, both with and without arms.



No. 4310
Goodform Chair
in Ebony Finish



No. 4206
30 x 42
Aluminum Table

Table tops are Textolite or Formica



No. 4218-30
30-inch
Aluminum Table

Smartly styled chairs now available in color-anodized finishes



No. 4419
Institutional
Chair



No. 4302
Institutional
Chair



No. 4295
Institutional
Chair



No. 4706
Institutional
Chair



No. 4275
Institutional
Chair



No. 4707
Institutional
Chair

Sectional lounge furniture and harmonizing tables in aluminum



No. 5250
Sectional
Lounge Chair

One basic chair with deep-cushioned foam rubber seat and back can be used with or without arms, singly or in groups of two or three.

End, corner and coffee tables are made with natural aluminum, gold, ebony and other color-anodized finishes and fitted with Textolite or Formica tops.



No. 4850
End Table





Executive Desk No. 1780F in Autumn Haze, with 80" x 42" overhanging Textolite top. Note matching console unit back of desk.

A GF DESK FOR EVERY OFFICE JOB

Over 100 models in three distinguished groups



Mode-Maker

Reg. U.S. Pat. Off.

No. 1770F EXECUTIVE DESK

America's finest desk! Now available in decorator finishes—Pine Frost, Glen Green, Autumn Haze, Manila Tan, Suede Brown and Standard Gray. Tops of Textolite or Velvoleum. Lifetime steel construction. No projecting hardware, sharp edges or corners. Aluminum trim may be color anodized. 39 models, each in either 29" or 30½" height. Tables, console units and telephone stands to match.



Generalaire

No. 1960F 60" DESK

Designed for office efficiency and modern streamlined appearance. Flexible drawer arrangement and interchangeability of parts permit easy conversion from one model desk to another. Many unique features. 46 different desks and tables in the line make it admirably suited to any office large or small. Available in Standard Gray, Pine Frost or Suede Brown, with Velvoleum or Textolite tops.



1600 Line

No. 1660FCR SECRETARIAL TYPEWRITER DESK

Leader in metal office desks for more than 30 years! Since its introduction in 1924, over 1,500,000 of the 1600 Line desks have been sold. Standard with hundreds of companies. It was the first production steel desk with only 4 legs and resilient Velvoleum writing top. The simple, practical design has been modernized repeatedly. 30 different types and sizes of desks and tables.

Super-filer
REG. U.S. PAT. OFF.

THE MECHANIZED FILE

5-, 4-, 3- and 2-drawer units. Counter height files in low 4s and 3s. Fireproofer insulated cabinets. Standard rigid front files



Super-Filer is as great an improvement over the rigid front steel files as were the latter over old-style, clumsy, heavy wood cabinets. Super-Filer is standard filing equipment in thousands of offices, from the largest insurance companies to small one-man businesses.

Super-Filer performs mechanically many operations done manually with conventional files. A swing front on each drawer mechanically adds working space for handling contents when a drawer is opened. Contents part instantly at the right place for removal or placement of papers.

The unique construction of Super-Filer means four-way saving to users:

1. Saving of time and effort in finding and filing.
2. Saving through increased payload (18%) in each drawer.
3. Saving equipment dollars. Two 5-drawer Super-Filers have the capacity of three 4-drawer conventional files.
4. Saving in floor space and maintenance costs.

Super-Filer Lo-4 and 3-drawer cabinets can be arranged in banks as counters, with continuous tops of Velvoleum or Textolite. Many, flexible combinations for correspondence, cards, checks and other forms are possible.

"Fireproofer" insulated files are furnished in 3 and 4 drawer cabinets. A full line of GF rigid front files is made also.





GF METAL FURNITURE OF SPECIAL DESIGN

for Banks, Libraries, Hospitals and other Institutions



• To serve institutions whose requirements are specialized, General Fireproofing operates a separate Contract Department which designs, builds and installs interior equipment. In the fifty years for which this individualized service has been offered, GF has equipped literally thousands of well known banks, hotels, schools, clubs, ships, trains, libraries, hospitals and other institutions in every state of the union.

The GF Contract Department maintains a staff of competent engineers, designers and artists long experienced in working with architects, interior decorators, contractors and builders. They are familiar with the specialized needs of all manner of institutions, the result of often repeated handling of diverse jobs, ranging from simple adaptation of stock furniture items to complete designing and building of interior equipment for the largest structures.

The long list of GF hospital installations, for example, includes the complete range of interior furnishings, such as cabinets for the storage of supplies and surgical dressings, instrument cases, utility cabinets, blanket warmers, counters, tables, desks, chairs, stools and scores of other items.

Library equipment furnished ranges all the way from small cabinets for 3 x 5 cards to the planning, building and installation of complete building interiors, housing hundreds of thousands of volumes—book stacks, trucks, racks, charging desks, exhibit cases, reading tables, chairs, study carrels and other varied pieces.



2



3



4



5

No. 1 A suburban branch bank
No. 2 Resident pathologist's office
No. 3 Nurses' station and counter
No. 4 Library study carrels
No. 5 Free-standing library book units

STEEL SHELVING

for Shop, Office, Factory

GF steel shelving is designed so that the simplest or most complex installation is assembled by the use of only a few basic parts.

The basic structural elements of any shelving installation are posts and shelves. To these, backs, sides, bin dividers, bin fronts, doors, and other stock accessories may be added as required.

The posts are angle type, with 1″ and 1¾″ faces. Both faces are punched on 1″ centers so that shelves may be bolted to the posts where desired, and each shelf will be thus attached at eight points. The shelves, made in various widths and depths, are channel shaped on all four sides for maximum stiffness and load-carrying capacity. Shelves are punched lengthwise on 2″ centers for attaching bin dividers.

The buyer of GF steel shelving need not pay for any unnecessary weight and strength beyond that required at the time of purchase. If additional strength is needed later, necessary reinforcing members can then be added to the existing installation.

GF shelving is erected in units, each unit being a complete, self contained section with four posts, capable of use alone or bolted together with a number of similar units. The unit type of shelving has the advantage of maximum convenience if it is ever necessary to rearrange the shelving. It is necessary only to unbolt the units and move them, as units, to the new location.

A minimum of time and effort is required for the installation of GF shelving. There is no need for special cutting or fitting on the job. Therefore, GF shelving can be erected by anyone; and the only tools required are a wrench and screw driver. A factory supervisor can be had at an established daily rate to superintend erection on larger installations. Labor can be supplied either by the purchaser or contracted for with the factory.

GF shelving has an oven-baked enamel finish, which is applied with the same care as is the finish on GF desks and files. Standard finish is GF gray. Olive green and other finishes are also available.



Draft-a-Matic®

draftsmen work in comfort

First new idea in drafting tables in many generations! A metal desk on which is hinged a Velvoleum-covered drafting platform, adjustable to any desired angle. Drawing is attached to a wide, revolving, self-healing plastic belt. Proper portion of drawing is always immediately before the draftsman, who sits comfortably in a regular office chair. No standing, no stooping! Write for special Draft-a-Matic Bulletin.





For lowest lifetime cost it pays to buy the best from the world's foremost maker of metal furniture



The General Fireproofing Company, Youngstown 1, Ohio

● The General Fireproofing Company has been a leading manufacturer of metal furniture for more than 50 years and today is the largest producer in the world of aluminum chairs, steel desks, steel files and steel shelving. Resulting from this long and versatile experience are the high quality, modern yet practical design, and the many progressive features for greater user benefits that characterize all GF products. It is this experience, also, that permits this company to place an unqualified guarantee on the workmanship in every item of its manufacture.

Since building its first aluminum chair in 1930, GF has produced more than four million seating units for offices, institutions, ships, trains, and planes.

Over 30 years' experience in metal desk manufacture stand behind GF's three great lines—Mode-Maker, Generalaire and 1600 Line. In that time more than two million desks and tables have been fabricated, most of which are still in service.

Twenty-one years ago, GF introduced Super-Filer, a radical innovation in filing equipment. Now it is the standard by which files are measured. No other file approaches Super-Filer in capacity, efficiency or ease of operation. In 53 years of steel filing cabinet production, GF has placed in service upwards of fifteen million units of various types and sizes.

GF steel shelving and storage units are of the same high quality materials and workmanship present in all other items bearing the GF trademark. They are assembled to every user's individual requirements from standardized, shop-fabricated parts.

GF service to its customers does not stop with the manufacture and sale of stock furniture. A competent Contract Department designs and installs special equipment for banks, ships, hospitals, libraries and courthouses. A staff advisor assists in the layout of offices and the selection of furniture and furnishings in colors planned for decorative effect. GF service also includes repair and rebuilding of furniture when required and the supply of replacement parts.

THE GENERAL FIREPROOFING COMPANY · YOUNGSTOWN, OHIO

SALES AND SERVICE BRANCHES AND DEALERS

Direct factory branches in 15 cities and independent GF dealers in other cities, large and small, throughout America are prepared to meet your need for anything in the complete General Fireproofing line of metal furniture.

If you are not now in touch with the local GF sales and service dealer, consult the yellow pages of your classified telephone directory—or write the GF home office. GF branches are located as follows:

Boston 15, Mass.—805 Commonwealth Ave.
Chicago 1, Ill.—230 N. Michigan Ave.
Cleveland 14, Ohio—3510 Chester Ave.
Detroit 1, Mich.—2121 Second Ave.
Hartford 5, Conn.—30 Garden St.
Los Angeles 15, Calif.—1200 S. Hope St.
Minneapolis 1, Minn.—310 N. First St.
Newark 2, N. J.—14 William St.
New York 36, N. Y.—500 Fifth Ave.
Oakland 12, Calif.—322 Nineteenth St.
Philadelphia 3, Pa.—2301 Chestnut St.
Pittsburgh 12, Pa.—924 Manchester Ave.
St. Louis 3, Mo.—3033 Washington Ave.
San Francisco 3, Calif.—1025 Howard St.
Washington 4, D. C.—1325 E. St., N. W.

ALL-STEEL EQUIPMENT INC.

Aurora, Illinois

SMARTLY-STYLED, RUGGEDLY-BUILT SCHOOL EQUIPMENT



PRINCIPAL'S DESK (above) TEACHER'S DESK (below) Convertible non-glare linoleum or vinyl tops. Interchangeable drawers. Self-lubricating nylon glides on drawers.

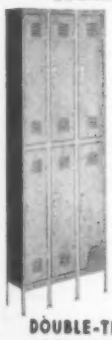




SINGLE-TIER LOCKERS

ASE
AURORA ILLINOIS
ALL-STEEL EQUIPMENT INC.

School administrators everywhere are turning to ASE for *all* their school furniture and locker requirements. They know that ASE products will increase the efficiency of school operation, add smartness to school interiors . . . for years and years to come. A favorite feature with ASE users is convertibility—desks and tables can be converted to different functions to match your changing requirements. Write us for further information.

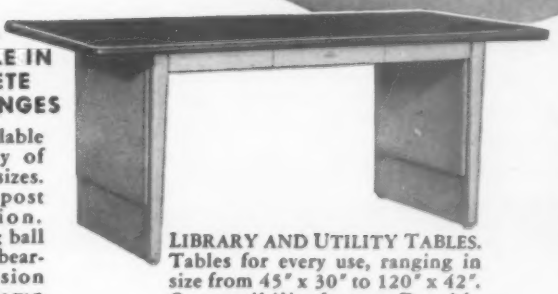


DOUBLE-TIER LOCKERS



ASE FILES AVAILABLE IN 3 COMPLETE PRICE RANGES

FILES. Available in a variety of styles and sizes. Rugged 6-post construction. Free-floating ball and roller bearing suspension cradle. Dawn Gray, ASE Green, Mist Green, Stylite Tan.



LIBRARY AND UTILITY TABLES. Tables for every use, ranging in size from 45" x 30" to 120" x 42". Convertibility feature. Durable linoleum tops. Bonderized finishes. Dawn Gray, ASE Green, Mist Green or Stylite Tan.



STORAGE CABINET. Ideal for classroom supplies, art materials, janitor's supplies, many others. Available in varied shelf and storage arrangements. ASE Green or Dawn Gray.



BOX AND MULTIPLE-TIER LOCKERS

LOCKERS. A style for your every need. Concealed hinges. Ample ventilation. Specially-designed ASE locker handle operates smoothly, easily. Prelocking feature. In Dawn Gray and ASE Green.



No. 810 UTILITY CHAIR. Designed for all-day comfort. Foam rubber seat. Upholstery—Claremont, Gros Point or Naugahyde. Finishes—Dawn Gray, Stylite Tan, Mist Green, Brown and ASE Green.



No. 830 EXECUTIVE'S CHAIR. A truly outstanding chair. Precision manufactured. Luxuriously cushioned in thick foam rubber. Upholstery—Claremont, Gros Point or Naugahyde. Finishes—Dawn Gray, Stylite Tan, Mist Green, Brown and ASE Green.

ASE ALL-STEEL EQUIPMENT INC., *Aurora, Illinois*

DIEBOLD, INC.

Mulberry Road, Dept. AS-1, Canton 2, Ohio

Diebold offers schools record systems

Here are a few of the models of equipment that make up the Diebold Systems and protection lines used by the most progressive schools everywhere.

For complete data call your Diebold Man or write... Diebold, Inc., Canton 2, Ohio

Cardineer Rotary Card Files



Master Cardineer

Only Diebold can give you Cardineer! This model available in both hand and motor operated types. Accommodates cards 8" x 5". A turn of the rotor brings 5,500 records per unit to the operator for convenient desk high posting and reference.

The Master Cardineer is the only rotary file offering these facilities . . . (1) removable segments to divide work . . . (2) three edges of cards exposed for guiding and flashing . . . (3) open rotor sides for offsetting . . . (4) desk top or direct rotor posting optional . . . (5) segments for holding double rows of cards . . . (6) 30" of cards visible at all times.



Desk Model Cardineer

Choice of two models. Single rotor capacity 1,500 records. Double rotor capacity 3,000 records—both for any size card up to 6" x 4".

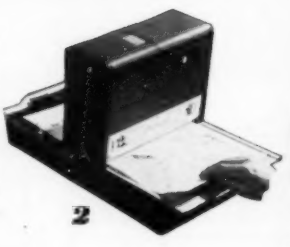


Desk Model Cardineer (Large)

This model revolves in a horizontal plane. The three card holding sections are removable for division of work. Capacity: 2,500 cards. Accommodates sizes 6" x 3½" to 8" x 8" or 9" x 5½".

Flofilm—*The complete microfilming process*

DUPLEX CAMERA — The Flofilm Model 9003 Camera (1) will microfilm copy up to 14" in width on either 16 or 35 mm film, one side or both sides simultaneously, up to 150 feet of copy per minute. Convenient low level feeding and eye level delivery of photographed documents. Automatic feed available. Electric eye trip to eliminate jamming of copy, an accurate film counter, and uncomplicated controls which an inexperienced person can operate. Of all-metal, lifetime construction.



2



3



1

PORTABLE CAMERA — This camera (2) weighs 20 pounds, will set on any desk, and can be operated by anyone. Fully motorized, it has an 11" throat, and microfilms faster than any operator can feed documents into it. Has magazine film loading which can be done in daylight; a partially-used film magazine can be removed and reinserted later for "split run" photographing. Small, compact, foolproof, amazingly inexpensive. Microfilms on 16 mm film any document, tissue to cardboard, at 24x reduction.

UNIVERSAL READER — The flofilm Universal (3) is the world's finest microfilm reader. Motorized film advance; all controls and film spools within fingertip reach of operator; inbuilt "Slo-flo" which automatically flows images across the screen at any speed chosen by operator. Image can be completely inverted by operator without moving from reading position. Enlargement ratios from 18 through 36x with one lens. Fingertip focusing. Handles any type 16 or 35 mm microfilm—plain, perforated, in strips or mounted, and makes paper photo enlargements of any image.

DIEBOLD, INC.

Mulberry Road, Dept. AS-1, Canton 2, Ohio

complete

and protection

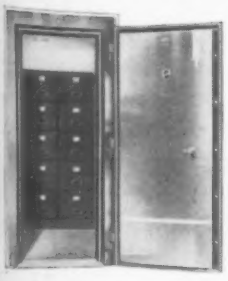
Diebold *Systems* — RECORD-HANDLING — ROTARY · VERTICAL · VISIBLE · MICROFILM

MICROFILM • ROTARY, VERTICAL AND VISIBLE FILING EQUIPMENT • SAFES, CHESTS AND VAULT DOORS • BANK VAULT EQUIPMENT • BURGLAR ALARMS

Fire Resistive Safes



Diebold's reputation has been built on record protection equipment. Tested by Underwriters' Laboratories for endurance in 1, 2 and 4 hour fires, plus drop and explosion tests. Any arrangement of safe interiors can be provided.



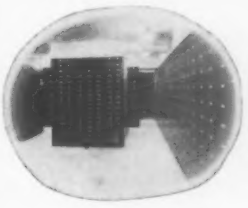
File Storage Room and Book Vault Doors

File Storage Room doors carry fire ratings of ½ hour and 1 hour. Book Vault doors are rated at 2, 4 and 6 hour fire endurance. All doors bear Underwriters' Laboratories labels and are equipped with relocking and unlocking safety features.



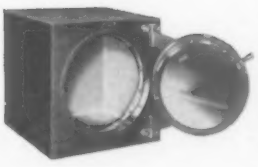
Tra-Dex Vertical Visible Files

Adds visibility to vertically filed records for speedy glance finding and faster processing. Makes visual checking and control possible by exposing columns of entries. Visible margins can be ½" to 3" wide. Available in portable sections and large capacity manifold styles for cards up to 12" high in any width.



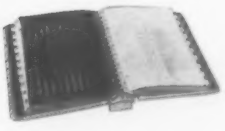
Safe-T-Stak Steel Storage Files

Reduce storage space requirements up to 40%. Can be interlocked vertically, side-by-side, and back-to-back for maximum safety. Fully loaded drawers open easily, even when stacked ceiling high.



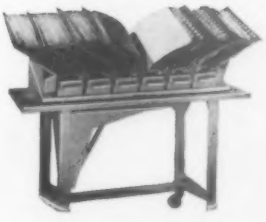
Cashgard Chests

Eliminate burglary and hold-up hazards. Protect your funds in a Diebold Cashgard Chest. Reduced burglary insurance premiums will soon repay the full cost.



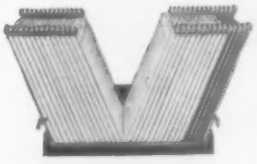
Flex-Site Loose-Leaf Visible Binders

Models and sizes taking up to a thousand or more records per unit. Form sizes from 2⅜" x 7½" to 15½" x 18" or larger. Especially applicable when flexibility, portability, compactness, low cost and easy fire protection are important factors.



Multi-Flex

To extend the advantages of individual Flex-Site units (described above) to larger installations. All necessary operations are performed without removing the individual Flex-Site units. 10,000 records easily housed in this manner.



V-Line Posting Trays

Automatic "V" eliminates "getting ready to post" operations . . . reduce "machine waiting time" between postings...increase overall record production. Adaptable to any form up to 17" x 14" on bond, ledger or index bristol.

THE GLOBE-WERNICKE CO.

Cincinnati 12, Ohio

Manufacturers of the World's Finest Business Equipment, Systems, Filing Supplies and Visible Records

All facilities of educational institutions are being burdened to the utmost, and administrative work is correspondingly heavy. Only the highest efficiency can bring some measure of relief to this situation. Globe-Wernicke furniture, equipment and systems are serving the pressing and often abnormal needs of countless institutions. These products are widely known for their excellent appearance, enduring quality, efficient performance and practical economy.

For more than 70 years Globe-Wernicke has maintained leadership in engineering and design, skilled craftsmanship, and manufacturing standards. Only a few of the 4000 products in the Globe-Wernicke line are shown here. Detailed information will be given promptly on request. See address above.



STREAMLINER METAL DESKS

These improved desks with their beauty, dignity and efficiency are especially valuable for institutional use. Their smart, smooth-flowing lines plus such construction advantages as adjustable height, generous rigid top, easy and effortless drawer operation, and many other features make them the most advanced metal desks in America. Sturdy metal construction. Streamliner Tables are in matching design and colors. Finishes: seal gray, olive green, sea green, copper tan, grained walnut and grained mahogany. Ask for circular showing wide range of models.

"7000 LINE" METAL FILES WITH TRIGGER LATCH . . .



These 2, 3, 4, and 5-drawer files feature smooth operation and distinguished appearance with an enduring construction that is unparalleled in the industry. They are available in both letter and legal sizes and can accommodate G/W special insert drawers for documents, checks, cards and various other papers. Drawers glide smoothly and quietly on progressive ball-bearing roller slides. Positive locking action is easily released by concealed trigger latch in handle. Life-time baked-on finishes in seal gray, olive green, sea green, copper tan, grained walnut and grained mahogany. Circular on request.

VERTI-SWING HANGING FOLDERS



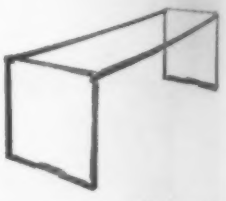
G/W Verti-Swing brings you all the advantages of suspended-folder filing plus an array of eight special features that make it the most advanced hanging folder on the market to date. Folders can't slump or sag. Papers stay neat and orderly. Slanted tabs are always at an even level for easy reference.

SAFEGUARD FILING SYSTEM



Safeguard is the utmost in simplicity and is completely adaptable to every filing requirement and indexing method. Fast, accurate filing and finding by novice or expert. Readily expandable to any needed capacity. Write for Safeguard Filing System circular.

VERTI-SWING FRAMES

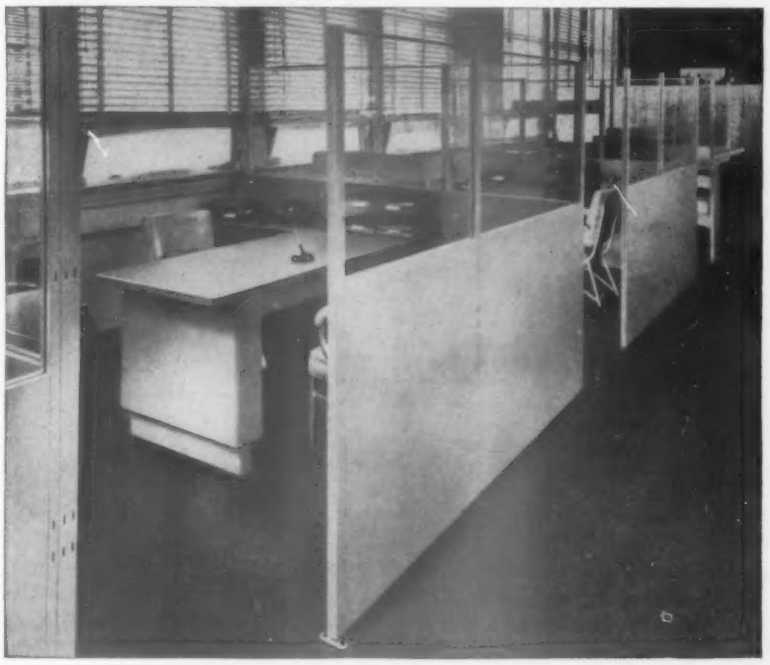


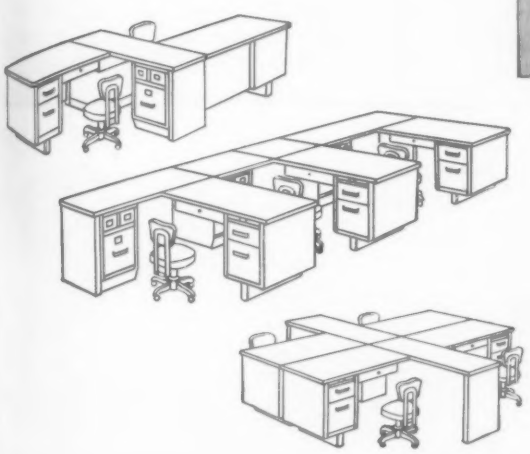
You can convert in minutes to Verti-Swing with frames that fit snug in all of your standard file drawers. Insert Verti-Swing frame, hang folders on frame, set up your own indexing systems with Verti-Swing accessories . . . and you're ready to file faster and better than ever before.

THE GLOBE-WERNICKE CO.

TECHNIPLAN
MODULAR OFFICE EQUIPMENT

You can have handsome, modern offices, arranged in any desired grouping or combination, with interchangeable, interlocking Techniplan units . . . designed to increase office efficiency. Techniplan can be adjusted to fit any kind of office layout or individual task, with improved comfort and working facilities and a significant saving of floor space. Interlocking or free-standing partitions provide privacy, reduction of noise and distractions. Write for illustrated catalog.





GLOBE-WERNICKE SECTIONAL BOOKCASES

Silent, receding, or sliding glass doors afford full visibility with modern styling. Globe-Wernicke sectional bookcases provide complete flexibility, unlimited capacity and ready adaptability to available space. Finishes: seal gray, olive green, sea green, copper tan, grained mahogany and grained walnut.









METAL BOOKSTACKS The advantages of Globe-Wernicke's metal library bookstacks (Snead) and accessories are fully described in Catalog 314. There is no obligation in calling upon the G/W library engineering staff *in an advisory* capacity.

STUDY CARRELS

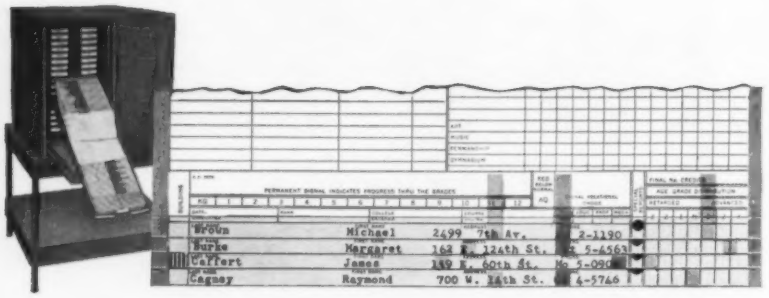
Free-standing study carrels provide the greatest flexibility possible for library areas. Made up of standard components, carrels can be easily assembled and reassembled in innumerable combinations to meet changing conditions and needs. Provisions are made for electrical wiring, which could accommodate individual fluorescent lights or electric business machines. Write for Catalog 314.

Write Contract Department,
The Globe-Wernicke Co., Cincinnati 12, Ohio

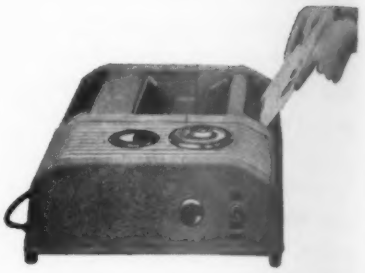
REMINGTON RAND

Division of Sperry-Rand Corporation

315 Fourth Avenue, New York 10, N. Y.



Kardex puts facts at your fingertips. Completely centralizes your records. Saves time by selecting items requiring immediate attention. Widely used for: Pupil History, Guidance and Attendance; Purchase and Stock; Budget, Health, Financial and Textbook Records.



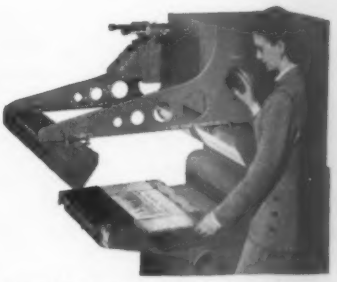
Single-unit Transcopy Duplex exposes, develops and prints photocopies in *seconds!* Portable, easy to operate, plugs into any socket. 100% accurate. Eliminates running water.



The "99" Printing Calculator provides fully *automatic* figurework performance including credit balances and new, exclusive Simpla-tape, for printed proof of accuracy.



Remington Rand All-Electric Adding Machine, 10-Key Touch Method operation. Perfect for teaching or office work. Cushioned power minimizes noise and vibration.



Remington Dexigraph produces up to 300 transcripts per hour. Copies same size or reductions down to 50%. Requires no plumbing, no special wiring. Can be moved room to room.



Remington Electric Typewriter Business Education Advancement Plan enables you to purchase famous Remington Electric Typewriters at lowest cost in history. Write today.



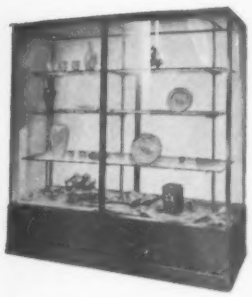
New Tested Tempo Touch Super-Riter, ideal for classroom teaching. Has new Perfect Positioning Scale for easier margin setting. New, built-in "touch" for fast, rhythmic typing.



Multi-Matic cuts payroll time in *half!* One writing gives you: 1. Employees Pay Statement, 2. Earnings History Record, 3. Payroll Record. No chance for transcription errors!

REMINGTON RAND

A complete line of Remington Rand Business machines, equipment and supplies is available for your school office, classroom or library. Whatever your need you'll find it doesn't cost—but pays to give us the responsibility for your installations. For complete information call your local Remington Rand office, or write Remington Rand, Room 1976, 315 Fourth Avenue, New York 10, New York.



Library Bureau Cases of Distinction have new "Fluid" lighting system that gives shadowless light. Dust and vermin proof. Table and upright models—lighted and unlighted.



Trend Library Furniture assures lasting beauty. Combines flush construction and rounded corners to eliminate dust, reduce splintering. Refurnishing or expanding, select Trend – the library furniture with the smart, modern look. Write for free booklets "TREND" and "PLANNING THE SCHOOL LIBRARY."



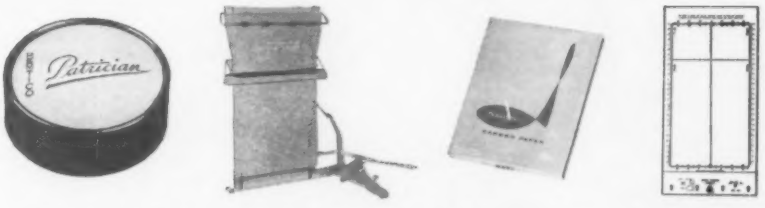
Aristocrat Lifetime Files. 3-drawer Aristocrat files with continuous linoleum tops, banded with metal edges, offer your office step-saving efficiency plus lifetime beauty.



Certified Safe-Files protect your valuable records. Files certified safe from heat of 1700°F. for at least one hour. Available for housing all card, letter or legal-size records.



Certified Safe-Cabinets. Certified for one, two or four hours against fire. Available with adjustable equipment for card index drawers, file drawers, document files and shelves.



Cost-cutting Supplies for Office and Classroom. Remington Rand Patrician Ribbon, made of imported cotton, ⅓ longer. Line-a-time holds copy at correct angle, prevents errors. Beautyrite Carbon Paper assures crystal-clear carbons. Procel Stencils, with plastic coating, ideal for illustration and form work. Use Remington Rand Supplies and note how you save.

Remington Rand

315 FOURTH AVENUE—NEW YORK 10, N.Y.

UNDERWOOD CORPORATION

One Park Avenue, New York 16, N. Y.

UNDERWOOD—*for the classroom*



Easier to teach—and easier for students to learn—because Underwood electric and standard typewriters stress simplicity of design and operation, are rugged and dependable in performance, preferred by business educators throughout the world.

UNDERWOOD ELECTRIC typewriters are easy on the typist, amazingly fast and accurate . . . a "natural" for quantity typing with a minimum of effort. Ask your local representative for a demonstration in *your* school.

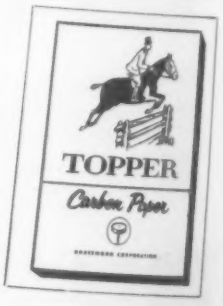
UNDERWOOD 150 A pace-setter among new standard typewriters. Diamond-Set margins and color-controlled keyboard help make the "150" ideal for beginners *and* professionals.





UNDERWOOD PORTABLE TYPEWRITERS
Here is the new Underwood Universal, for the student who takes pride in neatly typed term papers, reports, and personal correspondence . . . an educational helpmate in every sense.

UNDERWOOD SUPPLIES
You can *rely* on Underwood ribbons, carbon papers, stencils, and countless other office supplies to increase the speed and efficiency of your business operations.



UNDERWOOD CORPORATION

One Park Avenue, New York 16, N. Y.

...and for school administration



THE QUIET ADDING MACHINE
This Underwood Sundstrand has the simple 10-key keyboard, "muffled" action, and is *up to twenty per cent faster*. With Multi-flex Control, it will speed and simplify *your* figure-facts.



THE PRINTING CALCULATOR
by Underwood Sundstrand, is really *two machines in one*—a calculator that prints, and a general purpose adding-figuring machine. Learn how it applies to *your* office needs.

UNDERWOOD SUNDSTRAND Accounting Machines are used by numerous school systems throughout the world for budgetary accounting, students accounts receivable, accounts payable and payroll.

For details on particular models or applications, write to:



UNDERWOOD CORPORATION

ONE PARK AVENUE NEW YORK 16, N. Y.

• TYPEWRITERS • ADDING MACHINES • ACCOUNTING MACHINES • OFFICE SUPPLIES

THE NATIONAL CASH REGISTER COMPANY

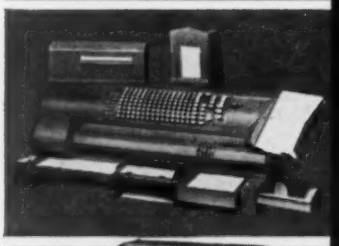
Dayton 9, Ohio



A *National* System

saves more than it costs!

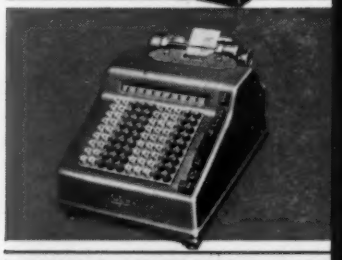
NATIONAL CLASS 31 ACCOUNTING MACHINE handles payroll, accounts payable, analysis, general ledger, and other accounting and billing work! On some jobs, 2/3 of the work is done automatically . . . and what the machine does automatically the operator cannot do wrong.



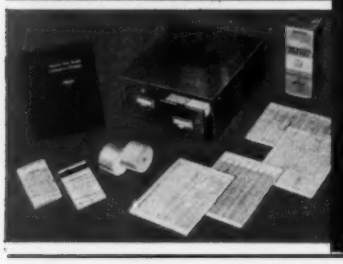
NATIONAL CLASS 2000 PAYROLL AND DISTRIBUTION MACHINE has the new Automatic Multiple Tax Computor, electric tax control, and automatic media handling devices! Posts 5 records simultaneously . . . posts and proves daily payroll accrual and distribution of labor in one operation . . . posts individual bond records . . . simplifies distribution . . . speeds work and promotes accuracy.



NATIONAL CLASS 6000 CASH REGISTER promotes accuracy by "publicizing" the prices charged . . . provides mechanically accurate addition . . . maintains customer confidence . . . speeds service and saves valuable time . . . records and totals tax . . . protects cash . . . *all* as a by-product of recording the sale!



NATIONAL ADDING MACHINE is the only adding machine that has all 8 basic time-and-money-saving features combined on one machine—features that save hundreds of motions every hour the machine is used. Departmental managers all over the country know from experience the many operating advantages and automatic features of the National Adding Machine.



NCR SUPPLIES save time, promote accuracy, speed service and give you up-to-date records when you want them. They include balance forms, files, ink ribbons, inventory forms, money bags, paper rolls, paid-out vouchers, profit and loss statements, received-on-account slips, register reading reports, sales books, salespersons' cash reports, statement books and sales sheets.

There are models for every size and type operation. The *complete* National System can be adapted to your individual needs. In operations of all types and sizes it saves *more* than it costs. How much will it save *you*—and how quickly? Let your nearby National representative—a trained systems analyst—show you.

*TRADE MARK REG. U. S. PAT. OFF.

National

CASH REGISTERS • ADDING MACHINES
ACCOUNTING MACHINES

THE NATIONAL CASH REGISTER COMPANY, Dayton 9, Ohio

977 OFFICES IN 94 COUNTRIES

THE HOLLISTON MILLS, INC.

Norwood, Mass.

NEW YORK • PHILADELPHIA • CHICAGO • MILWAUKEE • SAN FRANCISCO

Manufacturers of Bookbinding Fabrics

Color
Texture
Durability } Roxite

Make one word do the work of three . . . just say "Roxite" . . . good for any book—best for school books.

A complete assortment of qualities in new enlarged line of Vellums, plain and embossed — Linens — Buckrams — water repellent — soil resistant. Wide range of colors. Meets all specifications.

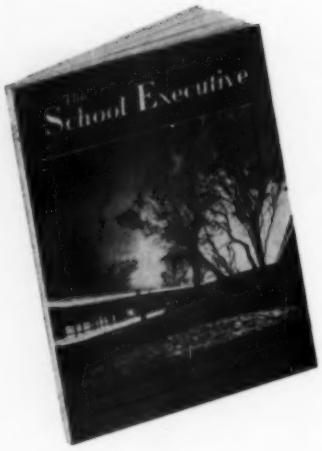
Holliston BINDING FABRICS

Tracing Cloths, Coated and Impregnated Fabrics, Viodite Vinyl Coated Fabrics, Rubber Hollands, Map Cloth, Photo Cloth, Reinforcing Fabrics, Sign, Label and Tag Cloths.

IT'S A BETTER BOOK HOLLISTON BOUND

THE SCHOOL EXECUTIVE

470 Fourth Avenue, New York 16, N. Y.



THE SCHOOL EXECUTIVE believes that school administrators look to their professional magazine for these major services:—

1. **Reporting and interpretation of educational news.**
2. **Reporting of successful administrative practices.**
3. **Presentation of educational issues and policies.**
4. **Counsel on educational planning.**
5. **Counsel on school plant planning.**

1. School Executive gives high priority to news each month in the following three separate sections:

In "Spotlight" our editors briefly highlight the month's interesting and important happenings on the educational front, providing busy school administrators with a panorama of the rapidly unfolding educational scene.

Because of its key importance, The School Executive provides on-the-spot coverage of the Nation's capital through Belmont Farley's monthly news letter, "The Washington Scene," telling what is going on that affects education in Congress and in the myriad departments and bureaus of the federal government—and what it means to schools.

The School Executive staff saves many hours of research for school administrators by culling out and reporting in "New Product Reviews" section the best and latest developments in equipping and maintaining the school plant.

2. Articles on successful administrative practices and programs are featured each month in the "Schools in Action" section of The School Executive. Authored by leading educators, "Schools in Action" articles are eminently practical—reporting aims, plans, methods and results.

3. The school administrator looks to his professional magazine to inform and enliven his thinking on educational policy, and expects the magazine to take a forthright position on controversial issues.

The School Executive editorials in "Keynotes" reflect the combined insights and experience of the editor and leaders in the profession. The position of this magazine on major educational issues is democratically developed by its staff and editorial advisory board.

Another interpretive feature upon which readers of The School Executive have come to rely increasingly is the page "As I See It" by Dr. Walter D. Cocking.

It is a major responsibility of the administrator to see that the members of his school board, his professional staff, and leading citizens in his community are kept informed concerning educational issues, pending legislation and other developments likely to affect the local schools. Such an interpretation of education to laymen interested in public education is the function of "Our Schools," a four-page insert which is bound in The School Executive each month, also offered in reprint form. Each month "Our Schools" discusses in non-technical language an important issue confronting the schools.

4. The successful administrator takes time to plan . . . In his schools educational planning is a continuous process involving the entire staff. He looks, meanwhile, to his professional magazine for help in his planning. Each month, in The School Executive, a comprehensive section is devoted to a study of one important planning problem, treated from a variety of angles covering both the underlying educational theory and its practical application.

5. School Executive believes that new school buildings should be designed to meet the needs of communities. "School Plant Planning" is a monthly feature through which School Executive seeks to make available to all who are engaged in the planning of new schools the experience and knowledge of specialists including architects, state directors of schoolhouse planning, school administrators and school plant consultants in the universities. School Executive also sponsors the annual Competition for Better School Design to encourage creative thinking in the design of educational buildings and to call attention to design which is interpreting modern educational programs effectively.

Subscription rates: 1 year $4.00; 2 years $7.00.

E FOOD SERVICE—HOMEMAKING—DORMITORY

1. Lunchroom

Haldeman-Homme Mfg. Co.	**E–1/Ha**
Rol-fol Table, Inc.	**E–1/Ro**
Schieber Sales Company	**E–1/Sc**
Boonton Molding Company	E 5
Corning Glass Works, Consumer Products Division	E 6, 7
The International Silver Company, Hotel Division	E 8
Keyes Fibre Sales Corporation	E 9
Seat-Eat Incorporated	E 10, 11
Sico Manufacturing Company, Inc.	E 12
Oneida Ltd.	E 18

2. Kitchen

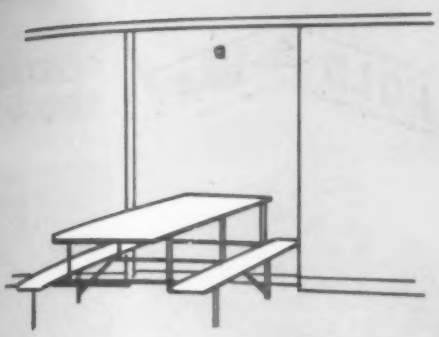
Anetsberger Brothers, Inc.	**E–2/An**
Market Forge Company	**E–2/Ma**
National Cornice Works	**E–2/Na**
S. Blickman, Inc.	E 13
The Aluminum Cooking Utensil Company	E 14, 15
The Cleveland Range Co.	E 16
Nutting Truck and Caster Company	E 17
Puffer-Hubbard Refrigerator Company	E 19
Toledo Scale Company	E 20
The Triumph Mfg. Co.	E 21
Universal Dishwashing Machinery Co.	E 22
Universal Industries	E 23
The John Van Range Co.	E 24
Sedgwick Machine Works	E 32

3. Homemaking Laboratory

General Electric Co., Appliance & Merchandise Dept.	**E–3/GE**
Mutschler Brothers Company	**E–3/Mu**
White Sewing Machine Corporation	**E–3/Wh**
Wood Metal Industries, Inc.	**E–3/Wo**
Coppes, Incorporated	E 25
Singer Sewing Machine Co.	E 26

4. Residence Hall

Carrom Industries, Inc.	E 27
Simmons Company	E 28, 29
Superior Sleeprite Corp., Contract Division	E 30, 31
Sedgwick Machine Works	E 32



WALL-ATTACHED FOLD-A-WAY TABLES
(With or without Benches)
(P-4)



PORTABLE FOLD-A-WAY
TABLES WITH BENCHES
(P-2)

Erickson

FOLD-A-WAY PORTABLE PRODUCTS

for Multiple Use of Space

- ★ *Wheel quickly to any room*
- ★ *Set-up or Fold-A-Way in seconds*
- ★ *Store in amazingly little space*

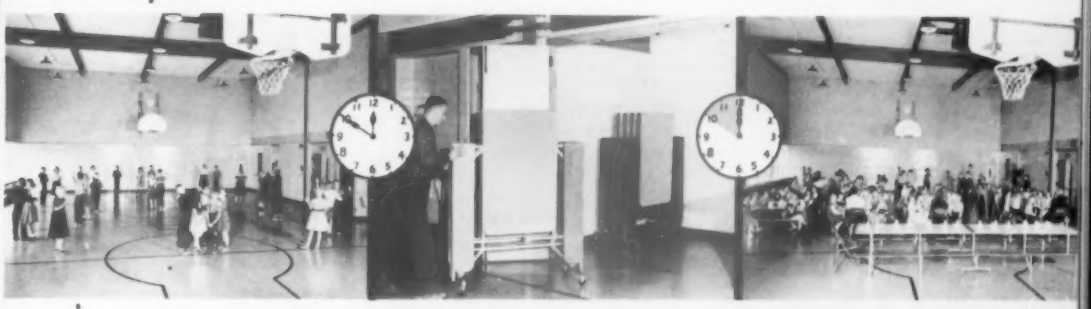


PORTABLE FOLD-A-WAY TABLES
WITHOUT BENCHES
(P-2)



'3-SECOND'
FOLD-A-WAY PORTABLE
BANQUET TABLES
(P-2)

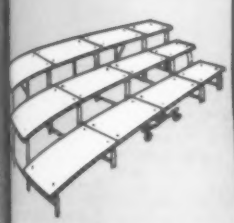
Example—



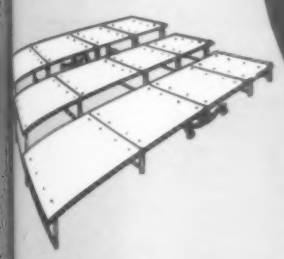
One man converts gym to lunchroom in just **10 minutes**

This Multi-Purpose Room in the new Falcon Heights, Minnesota, elementary school serves as lunchroom, auditorium and gymnasium. Its busiest time is the noon lunch period. Changeover from Phy. Ed. class to lunchroom takes 10 minutes. Eight Erickson Portable Fold-A-Way tables with benches are set up to seat 192 pupils at one time. Over 300 pupils are fed during the period. Dan Forsyth, custodian, makes the changeover without help except for clearing and washing the Formica table tops.

Case History courtesy of: Superintendent Emmett Williams; Principal B. M. Nelson; Architects Magney, Tusler & Setter.



PORTABLE FOLD-A-WAY
CHORAL RISERS
(Seated or Standing)
(P-3)



PORTABLE FOLD-A-WAY
SEATED BAND STANDS
(P-3)



PORTABLE FOLD-A-WAY STAGES
(P-3)



PORTABLE FOLDING-LEG
BANQUET TABLES
(P-4)

Manufactured by

HALDEMAN-HOMME MFG. CO.

2580 University Avenue, St. Paul 14, Minnesota **NEstor 6139**

Erickson Multi-Purpose FOLD-A-WAY PORTABLE PRODUCTS

PORTABLE WITH BENCHES

USES

SCHOOLS—Convert a Gym, Classroom or Corridor into a lunchroom in minutes. A complete 14 ft. table seating 24 students sets up in only 15 seconds.

INDUSTRIAL PLANTS—Ideal where cafeteria and lunchroom space is limited. Fast conversion keeps labor costs way down.

OTHER INSTITUTIONS—Churches, Lodges, Clubs, Public Institutions achieve dual use of space at great savings in space and labor.

ADVANTAGES

FULLY PORTABLE—Tables wheel anywhere on their own rubber-tired casters. No carrying problems. No marring of floors. **EASY TO USE**—In one simple operation the patented Fold-A-Way understructure folds or unfolds automatically.

RUGGEDLY BUILT—Will withstand years of hardest use. Tables are solid; will not wobble or creep.

BONUS USES—Schools report they're using Fold-A-Way tables for craft classes, study halls, conferences, etc.

MINIMUM STORAGE—Ten Fold-A-Way tables with seating capacity for 240 students store in only 4½ x 10 ft.

ECONOMY—Cost is comparable to ordinary tables and chairs.



Specifications—See P-4

Dimensions

Model	Length	Width	Table Top Width	Height Folded	Top Height Unfolded	Bench Height
1429-B	14'	52"	30"	65"	29"	17"
1427-B	14'	52"	30"	65"	27"	15"
1229-B	12'	52"	30"	59"	29"	17"
1227-B	12'	52"	30"	59"	27"	15"



CONSTRUCTION—Tops ¾" plywood covered with tan linen plastic laminate. Edges protected and sealed with "T" type flush plastic molding. Underside of top sealed with plastic laminate balancing sheet. Benches are ¾" plywood, rounded, sealed, and finished with 4 coats of tan Hammerloid synthetic alkyd enamel. Understructure is 1½" square formed steel tubing, with 3 coats of tan Hammerloid baked enamel. Folded unit wheels on casters.

TABLES WITHOUT BENCHES

USES

SCHOOLS—Convert any available area into lunchroom in minutes; permitting use of separate benches, chairs or stools.

CHURCHES—Convert basement or activities room into banquet hall or Sunday School class, quickly, with minimum of effort.

HOTELS, CLUBS, BALLROOMS—Provide extra tables when needed.

BANKS, OFFICES, STORES—Provide extra working tables or display counters when necessary.

ADVANTAGES

FAST OPERATING—One man or woman can set-up or fold-away a full-sized 14 ft. table in only 15 seconds.

EASY TO SET UP—In one simple operation the patented understructure folds or unfolds automatically.

FULLY PORTABLE—No dollies or trucks needed. Tables wheel to anywhere on their own rubber-tired casters.

RUGGEDLY BUILT—Will withstand years of hardest use. Tables will not wobble or creep when set up.

MINIMUM STORAGE—Ten 14 ft. tables store in only 3½ x 10 ft.

ECONOMY—Cost is moderate and is offset in a short time by the great savings in labor and storage space.



Specifications—See P-4

Dimensions

Model	Length	Unfolded Width	Height Folded	Height Unfolded
1429	14'	30"	65"	29"
1427	14'	30"	59"	27"
1229	12'	30"	65"	29"
1227	12'	30"	59"	27"



CONSTRUCTION—Tops ¾" plywood covered with tan linen plastic laminate. Edges protected and sealed with "T" type flush plastic molding. Also available with a gray "desk top" linoleum. Underside of top sealed with plastic laminate balancing sheet. Understructure is 1⅛" square formed steel tubing, with 3 coats of tan Hammerloid baked enamel. Folded table wheels-a-way on 4 rubber-tired ball bearing casters.

'3-SECOND' BANQUET TABLES

USES

SCHOOLS—Convert any area into a multi-purpose area. Gym becomes banquet hall or lunchroom in minutes.

CHURCHES, INSTITUTIONS—Provide maximum table capacity with minimum of set-up time and labor.

HOTELS, RESTAURANTS, FACTORIES—Convert single-purpose space into cafeterias, dining rooms when needed. Save storage space, save set-up labor costs.

ADVANTAGES

FULLY PORTABLE—Tables wheel anywhere, giving mobility never before known in the banquet table field.

EASY OPERATING—So simple even a youngster can fold or unfold in 3 seconds.

POSITIVE STABILITY—Table locks in either folded or unfolded position. Brake prevents creeping when in use.

MINIMUM STORAGE—Tables fold and store together compactly.

VERSATILITY—Both round and rectangular tables available. Various combinations give most effective use of space.

ECONOMY—Cost of Fold-A-Way banquet tables is comparable to ordinary banquet tables.



Specifications—See P-4

Dimensions

Model	Length	Diameter	Width Unfolded	Height Unfolded	Height Folded
296	6'	.....	30"	29"	42"
298	8'	.....	30"	29"	54"
2910	10'	.....	30"	29"	66"
2960 Round	.....	60"	.....	29"	36"
2966 Round	.....	66"	.....	29"	39"
2972 Round	.....	72"	.....	29"	42"



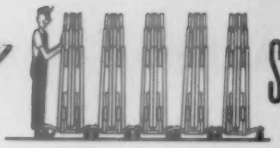
CONSTRUCTION—Tops ¾" plywood covered with gray plastic laminate. Edges are protected and sealed with "T" type flush plastic molding. Underside of top is sealed with plastic balancing sheet. Understructure is 1⅛" square formed steel tubing finished with 3 coats of tan Hammerloid baked enamel. Folded table wheels-a-way and nests-circular



FOLD-A-WAY



WHEEL-A-WAY



STORE-A-WAY

ORTABLE STAGES

OOLS—Fold-A-Way Portable stages set up quickly in s or classrooms to handle class plays, speech classes, ctions or class photos. Units combine to form stage of y size.

S, RESTAURANTS, FACTORIES—Provide multiple use of s. Convert any available area into theater or auditorium.

CHES, INSTITUTIONS—Provides a fast set-up stage for all ions, yet store in amazingly little space when not in use.

NTAGES

LY PORTABLE—Each individual stage folds-a-way in 15 nds and wheels-a-way on its own rubber-tired casters.

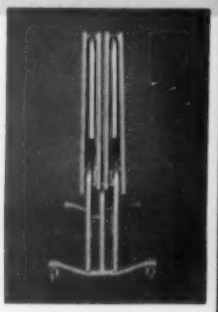
LY VERSATILE—Units interlock to form any size stage ed. Available are units 4 ft. wide in 10 or 12 ft. lengths t in 8", 16" or 24" heights.

GEDLY CONSTRUCTED—Fold-A-Way Portable stages are lt to take heavy punishment for years without trouble.

IMUM STORAGE—Stages store in little space. A 12 by 12 tage (3 units) stores in only 4½ by 5 ft.

NOMY—Cost is moderate and is offset in a short time by t savings in time, labor and storage space.





Specifications—See P-4

Dimensions

Model	Length	Width	Height Unfolded	Height Folded
PS10- 8	10'	4'	8"	36"
PS10-16	10'	4'	16"	44"
PS10-24	10'	4'	24"	52"
PS12- 8	12'	4'	8"	42"
PS12-16	12'	4'	16"	50"
PS12-24	12'	4'	24"	58"

CONSTRUCTION— Platforms are 1⅛" 9-ply plywood finished with 2 coats of lacquer. Fast-acting safety clamps are provided for interlocking of units in any combination. Understructure is 1⅛" square formed steel tubing with 3 coats of tan Hammerloid baked enamel. Folded unit wheels-a-way on 4 rubber-tired ball bearing casters.

AND STANDS

OOLS—Fold-A-Way Portable band stand units set up and back to form any sized band stand. Convert a gym into ncert hall in minutes.

TORIUMS, CONCERT HALLS, THEATERS—Provide stands y group—small combos to symphony orchestras.

S, HOTELS, INSTITUTIONS—Fold-A-Way Portable band s enable multiple use of space: store-a-way in little e.

NTAGES

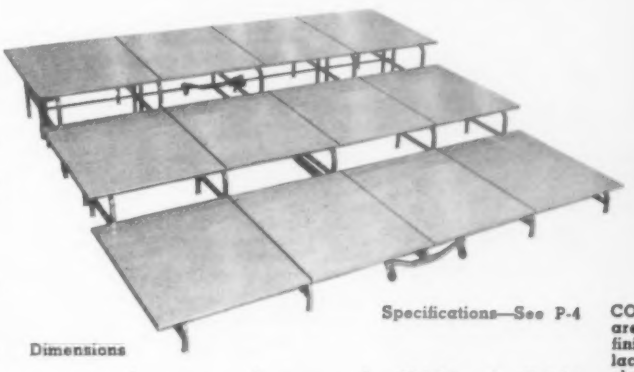
LY PORTABLE—Each unit folds or unfolds in only 15 nds: wheels-a-way on its own rubber-tired casters.

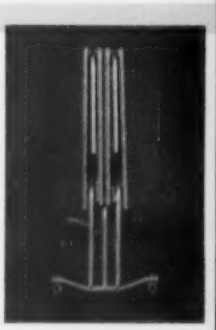
LY VERSATILE—Units are 4 ft. wide, 10 or 12 ft. long, available in rises of 8", 16" and 24". Write for free e showing units interlocked in many different arrangee.

ED CONSTRUCTION—Fold-A-Way units are built to tand years of punishment without giving trouble.

IMUM STORAGE—A complete 12 ft. (3 units) band stand e in only 4½ by 5 ft.

NOMY—Original cost is moderate and is offset in a short e by great savings in labor and storage space.





Specifications—See P-4

Dimensions

Model	Length	Width	Height Unfolded	Height Folded
SB10- 8	10'	4'	8"	36"
SB10-16	10'	4'	16"	44"
SB10-24	10'	4'	24"	52"
SB12- 8	12'	4'	8"	42"
SB12-16	12'	4'	16"	50"
SB12-24	12'	4'	24"	58"

CONSTRUCTION— Platforms are 1⅛" 9-ply plywood finished with 2 coats of lacquer. Fast-acting safety clamps are provided for interlocking of units in many combinations. Understructure is 1⅛" square formed steel tubing with 3 coats of tan Hammerloid baked enamel. Folded units wheel-a-way on 4 rubber-tired ball bearing casters.

HORAL RISERS { seated or standing }

OOLS—Portable Fold-A-Way choral risers set up quickly assrooms, gyms, auditoriums . . . for choir practice, con- class photos, or as bleachers.

DCASTING, THEATERS, CLUBS—Ideal in limited space. handling up to 40 people folds-a-way to 1 ft. length.

CHES, INSTITUTIONS—Provide multiple use of space at savings in labor and storage space.

NTAGES

ED OR STANDING—Two types available: standing, with s 16" deep; and seated, with platforms 32" deep.

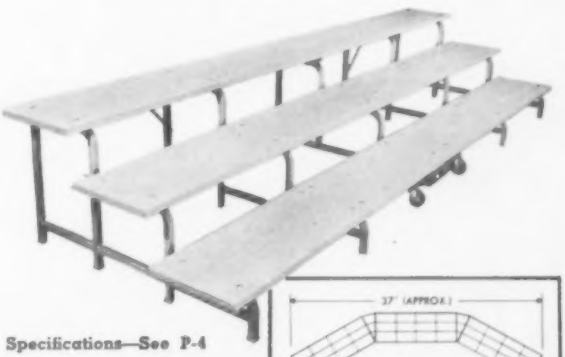
Y PORTABLE—Folds-a-way in 15 seconds and wheels-a- on own rubber-tired ball bearing casters.

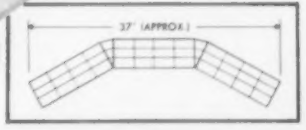
LY VERSATILE—"Instant Inserts" (diagram at right) per- semi-circular arrangements and extra capacity.

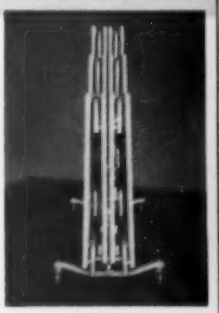
ED CONSTRUCTION—Built to withstand years of punish-

UM STORAGE—Three units handling up to 120 people -way and nest in only 3½ by 4 ft.

NOMY—Cost is moderate and is offset in a short time with savings in labor and storage space.







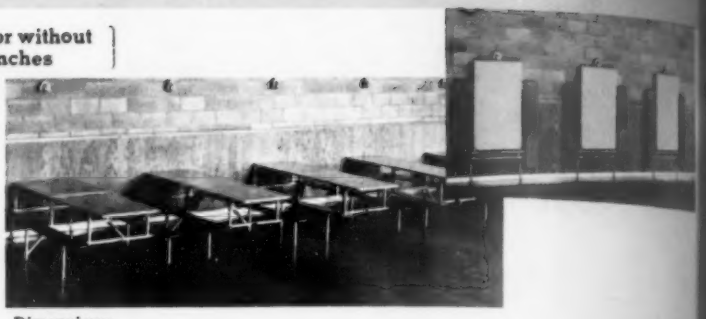
Specifications—See P-4

Dimensions

Model	Length	Width	Platform Depth	Rise Per Platform	Folded Height
S-10	10'	4'	16"	8"	52"
S-12	12'	4'	16"	8"	58"
SC-10 (2 units)	10'	8'	32"	8"	52"
SC-12 (2 units)	12'	8'	32"	8"	58"

CONSTRUCTION— Platforms are 1⅛" 9-ply plywood finished with 2 coats of lacquer. Understructure is 1⅛" square formed steel tubing with 3 coats of tan Hammerloid baked enamel. Folded unit wheels-a-way on 4 rubber-fired ball bearing casters.

WALL-ATTACHED TABLES { with or without benches }



USES

These models are ideal for lunchrooms and multi-purpose rooms where storage space is unavailable. Tables are 8 ft. long in two heights: 27" for elementary students; and 29" for adults. A spring bolt latch keeps table in fold-a-way position against the wall. Tables (and benches) lower into position with a single unfolding motion.

ADVANTAGES

SIMPLE INSTALLATION—Tables may be mounted directly to wall with supplied mounting bracket. Table projects only 5" from wall. Or, tables may be mounted flush by recessing 5". Or, tables may be concealed with appropriate doors by recessing 7".

MATCH PORTABLES—Wall-Attached and Portable tables may be used together to make best use of entire floor space.

MODERATE COST—Original cost is low and is offset by great savings in time, space and labor.

CONSTRUCTION—Wall-Attached tables have rugged construction identical to Portables described on page 2.

Dimensions

Model	Length	Table Width	Width With Benches	Height Folded	Top Height Unfolded	Bench Height
827	8'	30"	.....	72"	27"	
829	8'	30"	.....	72"	29"	
827-B	8'	30"	52"	72"	27"	15"
829-B	8'	30"	52"	72"	29"	17"

FOLDING—LEG BANQUET TABLES

Newest addition to the line of tables and stands manufactured by Haldeman-Homme is the pedestal-type folding-leg banquet table. Made in two lengths, 6 ft. and 8 ft., the table features special leg extensions that permit using at 22" height for youngsters and 29" height for adults. The top is ¾" plywood covered with Masonite or plastic laminate. Legs are 1⅛" square formed steel tubing, that fold or unfold in one continuous operation, and lock in either position.

Specifications

FURNISH AND INSTALL ..... WHERE SHOWN ON THE DRAWING, AS MANUFACTURED BY HALDEMAN-HOMME MFG. CO., 2580 UNIVERSITY AVE., ST. PAUL 14, MINNESOTA

(Include appropriate specifications under I, II, or III)

I. FOLD-A-WAY TABLES

Table tops to be of ¾" exterior plywood, genuine Formica (or plastic laminate) in tan linen with Formica (or plastic laminate) balancing sheet on underside, tops banded by flush plastic molding. Benches (when specified) to be ¾" plywood with fully rounded edges and finished with 4 coats of Hammerloid gray synthetic alkyd enamel. Understructure shall be 1⅛" square steel tubing of formed construction.

(Include also A, B, or C.)

A. PORTABLE TABLES shall be 12'0" (or 14'0") long and 27" (or 29") high, without benches (or with benches that fold and unfold with the table in one continuous operation). Units shall fold in 4 sections, be mounted on chassis having 4 rubber-tired ball bearing casters. Tables shall lock in folded position.

B. WALL-ATTACHED TABLES shall be 8'0" long and 27" (or 29") high, without benches (or with benches that fold and unfold with the table in one continuous operation.) Units shall fold in 2 sections with locking device to hold table in folded position. Enclosures or recesses, if required, to be provided by Contractor.

C. BANQUET TABLES shall be 8'0" (or 10'0" or 12'0") long and 29" high. Tops in gray plastic laminate (NEMA standard) with flush type plastic edge molding. Table shall fold in 2 sections with positive locking action in folded and unfolded position. Tables shall be equipped with rubber-tipped automatic friction brake to prevent drift or sway when unfolded.

II. FOLD-A-WAY STANDS

Platforms to be of 1⅛" 9-ply plywood finished with 2 coats of lacquer. Underside of platforms to be sealed with lacquer. Understructure shall be 1⅛" square steel tubing of formed construction, finished with 2 coats of tan Hammerloid baked enamel. Units shall fold in 4 sections, be mounted on chassis having 4 rubber-tired ball bearing casters. Units shall lock in folded position.

(Include also A, B, C, or D.)

A. STANDING CHORAL RISERS shall be 10'0" (or 12'0") long, be 4' wide, with each of 3 platforms 16" deep. Rise per platform shall be 8".

B. SEATED CHORAL RISERS shall be two matched units, each unit 10'0" (or 12'0") long and 4'0" wide. Each unit shall have 2 platforms, one 32" deep, the other 16" deep. Units shall be equipped with locking device to form one 3-level riser. Rise per level to be 8".

C. BAND STANDS shall be 10'0" (or 12'0") long, be 4' wide, and 8" (or 16" or 24") high. Units shall be provided with safety clamps for interlocking stands together.

D. PORTABLE STAGES shall be 10'0" (12'0") long, be 4' wide, and 8" (or 16" or 24") high. Units shall be provided with safety clamps for interlocking stages together.

III. FOLDING-LEG TABLES

Table tops to be of ¾" exterior plywood, Masonite (or plastic laminate) tops; tops completely banded with plastic flush-type molding. Legs shall be of pedestal type, formed of 1⅛" square steel tubing, and will fold and unfold in one continuous operation. Legs shall lock in folded and unfolded positions. Table tops shall be 6'0" (or 8'0") long and 22" high, with 4 extensions provided for increasing table height to 29".

GUARANTEE—MANUFACTURER SHALL GUARANTEE HIS PRODUCT FOR A PERIOD OF ONE YEAR AGAINST DEFECT IN WORKMANSHIP AND MATERIALS.

(U. S. Patent 2514319. Other Patents Pending)

PLANNING ASSISTANCE

Our Engineers will be glad to assist in planning lunchrooms and other multi-purpose areas to achieve best use of space. No obligation. Send your floor plan for their suggestions.

Representatives

ALABAMA, Birmingham
Bodine-Bryson & Rolling
719 So. 20th St.

ARIZONA, Phoenix
PBSW Supply & Equip. Co.
530 W. Washington St.

ARKANSAS, Little Rock
All-State Supply, Inc.
1401 W. Capitol Ave.

CALIFORNIA
Perier-Silverman
372 Darrell Road, Burlingame

Perier-Silverman
11105 Allerton St., Whittier

WASHINGTON, D. C.
Ralph S. Gromann & Co.
Suite 517 Wyatt Bldg.

FLORIDA, Sarasota
M. M. Bayard
P.O. Box 2389

GEORGIA, Atlanta
Chas. E. Cotton
3152 Argonne Drive N.W.

ILLINOIS
Waren Larson Co.
1835 Summerdale Ave.
Chicago 40

Miss Harriett M. Searles
Spring Grove

INDIANA, Indianapolis 2
Oglesby Equipment Co.
2163 N. Meridian St.
Tel. HIckory 0860

IOWA, Des Moines
Haldeman-Homme Co., Inc.
852-41st St.
Tel. 76-505

KANSAS, Wichita 3
F. H. Granner Co.
1037 Woodrow St.

KENTUCKY, Louisville 2
Office Equipment Co.
117 S. 4th Ave.

MARYLAND, Baltimore 2
Baltimore Stationery Co.
115 E. Lombard St.

MASS.-CONN., Boston 16
G. H. Towne Co.
203 Park Square

MICHIGAN, Detroit 19
Oglesby Equipment Co.
20356 Grand River Ave.

MISSISSIPPI, Jackson
John B. Howard Co.
600 W. Monument St.
P.O. Box 4505

MISSOURI
Len. A. Maune Co.
8500 Eager Road
St. Louis 17

S. W. B. Howard Co.
921 Walnut Street
Kansas City 6

MONTANA, Billings
Colborn School Supply Co.
27th & Minnesota

NEBRASKA, Omaha
Nebraska Custom Kitchens
4601 Dodge St.
Tel. GL-2313

NEW HAMPSHIRE, Keene
Robert A. Bennett
Hurricane Road

NEW JERSEY, East Orange
Atkins & Co., Inc.
19 N. Harrison St.

NEW YORK
Atkins & Co., Inc.
Mr. Gardner Wyeth
401 S. A. & K. Bldg., Syracuse

National Hospital Supply Co.
S. M. Friedman
38 Park Row, New York 38

W. K. Sauer Co., Inc.
7 Westgate Road
Kenmore 17

NO. DAKOTA, Grand Forks
Colborn School Supply Co.
Kedney Warehouse

OHIO
Bowling Green Equipment Co.
624 Wallace Ave., Bowling Green

The Theodore Kundtz Co.
1420 W. 25th St., Cleveland 13

Ronald A. Ferguson
Tel. TErrace 2330
Terrace Park (Southern) Ohio

Nola Products Co.
227 East Indianola Ave.
Youngstown, Ohio

PENNSYLVANIA
PlayCo Sales
Box 388, Mars

Atkins & Co., Inc.,
19 N. Harrison St.
East Orange, N. J.

SOUTH DAKOTA, Sioux Falls
Midwest-Beach Co.
222 S. Phillips Ave.

TENNESSEE, Nashville 2
John E. Johnson
Box 991

TEXAS, Dallas 2
W. C. Hixson Co.
205 N. Austin St.

VIRGINIA, Richmond 2
Virginia School Equipment Co.
104 S. Foushee Street

UTAH, Salt Lake City 15
H. W. Taylor Co., Inc.
2378 S. State St.
Phone: 3-9128

WASHINGTON, Seattle 8
Guy V. Sweet Co.
1406 E. 50th St.

WEST VIRGINIA, Spencer
Charles Holdorf Co.
Box 155

WISCONSIN, Milwaukee 1
Wm. L. Kittelberger
2708 S. 44th St.

HAWAII, Honolulu
W. Tip Davis Co.
801 Alakea St.
Frank Y. Murai

E-I-Ro

Rol-Fol

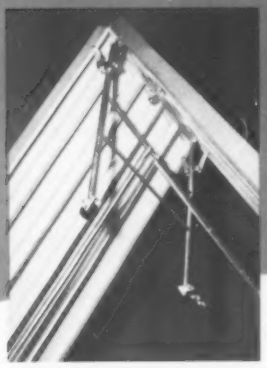
...all metal construction with 1/4 inch plastic tops

FOLDING TABLES and BENCHES

with SPACE-SAVING WALL CABINETS



...AND BENCHES LOCKED ...CESSED WALL CABINET.



LIGHTWEIGHT RUGGED ALUMINUM FRAME CONSTRUCTION AND PRECISION STEEL HARDWARE MAKES OPERATION EASY.



UNITS UNFOLDING FOR USE.

for Multi-Purpose Rooms and Social Halls...

STRONG, DURABLE ROL-FOL TABLES AND BENCHES, 14 FEET LONG WITH:

- Plasti-Ply top panels in a wide variety of colors and patterns.
- Extruded aluminum structural top frames, welded construction, with 2¼ inch wide anodized edge trim.
- Cadmium plated steel hardware and tubular steel undercarriage.

STEEL WALL CABINETS ONLY 5⅛ INCHES DEEP OFFER BUILDING CONSTRUCTION ADVANTAGES.

ROL-FOL IS THE IDEAL SOLUTION FOR Cafeterias or dining areas which must serve multi-purpose room functions.

ROL-FOL SOLVES STORAGE PROBLEMS. Fast, easy set-up and storage of tables and benches makes multi-use of a room truly practical. Save time and labor.

ROL-FOL STEEL WALL CABINETS eliminate the need of storage room space.

EIGHT CABINET MODELS offer wide installation flexibility for mounting in-the-wall and on-the-wall, with and without bench pockets. Double depth for storing two sets, where wall space is limited.

ROL-FOL TABLES AND BENCHES ARE INSTANTLY DETACHABLE FROM THE CABINETS, ALLOWING VARIOUS GROUPINGS.

COMFORTABLY SEATS 20 CHILDREN.



...ctured by

U.S. PATENT NO. 2,650,146—OTHER PATENTS PENDING— PRINTED IN U.S.A.

...ROL-FOL TABLE, INC. *8467 Melrose Place • Los Angeles 46, California*

Rol-Fol TABLES AND BENCHES

ALL-METAL CONSTRUCTION WITH ¼-INCH PLASTIC TOPS

SPECIFICATIONS

FOLDING TABLE AND BENCH SETS

Furnish two-leaf folding tables and benches 14 feet long, complete with steel cabinets, *in-the-wall* (or *on-the-wall*) Model No. (to be selected) as manufactured by ROL-FOL TABLE, INC., 8467 Melrose Place, Los Angeles 46, California. YOrk 2306. Tables and benches shall be all-metal construction with ¼" Plasti-Ply tops.

TABLES AND BENCHES

Tables shall be 14' long x 28" wide; benches 14' long x 11¾" wide, constructed as follows:

The top framework shall be extra heavy heat treated aluminum extrusions. Apron and trim pieces shall be one continuous member, ¾" x 2¼" special aluminum channel. Longitudinal support members shall be 1¾" x 3" special extruded aluminum hat sections, equally spaced, fitted in and welded to channel. Tables shall have four longitudinal support members, benches two support members.

Under carriage shall be electro-weld, high carbon steel tubing, ⅞" OD x 1/16" wall thickness. Leg cross braces only shall be ½" OD x 5/32" wall thickness.

Hardware shall be precision die formed of ⅛" steel.

Casters shall be Colson oil-less, non-marking, rubber tire.

Each table and bench shall be provided with two manually operated locks and a safety catch lock.

Plasti-Ply top panels, ¼" thick, shall be high pressure laminate of phenolic plastic with two melamine plastic facing surfaces. The decorative top surface color and pattern shall be selected by the purchaser from standard "LAMIN ART" (N.E.M.A. Spec.) samples of high pressure plastic laminate. Plasti-Ply shall be fitted and attached to the top frame to supply a tight flush joint with the apron.

All steel parts shall be cadmium plated, silver luster finish. The extruded aluminum edge frames shall be anodized.

TABLE AND BENCH HEIGHTS

To be selected by purchaser.
Standard table heights: 24", 25", 26", 27", 28", 29" & 30".
Standard bench heights: 14", 15", 16", 17", 18", 19" & 20".
Bench heights 10" lower than tables recommended.

DETACHABLE AND INTERCHANGEABLE

The extended tables and benches shall be instantly and individually detachable from the cabinet so they can be rolled about for various groupings. Any height table or bench shall operate in any cabinet.

STEEL CABINETS

Wall cabinets to house tables and benches shall be all welded construction of 16 gauge steel. Cabinet depth shall be 5⅛"—(10" for T-2 and TB-6 Models). When cabinets are set in masonry (specify) three adjustable strap anchors shall be welded to jambs on each side of cabinet by manufacturer. Cabinets shall be factory prime painted. Finish painting after installation shall be done by contractor or purchaser.

INSTALLATION

Contractor or purchaser shall provide wall recesses for in-the-wall models, install cabinets and place tables and benches in cabinets. The cabinets are to be set plumb, true and level and anchored according to manufacturer's recommendations. Sales agent shall provide installation drawings and instructions.

NOTE: The manufacturer reserves the right to make material and design changes to further improve the product.

MODELS			CABINET DIMENSIONS				
MODEL	COMPRISES	CABINET APPLICATION	HEIGHT OVER-ALL FRONT	HEIGHT OVER-ALL REAR	WIDTH OVER-ALL FRONT	WIDTH OVER-ALL REAR	DEPTH
T-1M T-1F	1 Table & Steel Cabinet	on-the-wall in-the-wall	86 9/16" 86 9/16"	—— 85⅛"	32¼" 32¼"	—— 29⅜"	5⅛" 5⅛"
T-2M T-2F	2 Tables & Double Depth Steel Cabinet	on-the-wall in-the-wall	86 9/16" 86 9/16"	—— 85⅛"	32¼" 32¼"	—— 29⅜"	10" 10"
TB-3M TB-3F	1 Table 2 Benches & Steel Cabinet	on-the-wall in-the-wall	86 9/16" 86 9/16"	—— 85⅛"	60¼" 60¼"	—— 57⅜"	5⅛" 5⅛"
TB-6M TB-6F	2 Tables 4 Benches & Double Depth Steel Cabinet	on-the-wall in-the-wall	86 9/16" 86 9/16"	—— 85⅛"	60¼" 60¼"	—— 57¾"	10" 10"

"F" MODELS SIGNIFY FLANGE TYPE CABINET FOR IN-THE-WALL INSTALLATION. THIS FLANGE OVERLAPS FINISH WALL. "M" MODELS HAVE ENCLOSED MULLION CABINET EDGE FOR INSTALLING PRIMARILY ON-THE-WALL. WRITE FOR INSTALLATION DRAWINGS.

ROUGH OPENINGS TO HOUSE FLANGE TYPE CABINETS ARE TO BE:
½" HIGHER THAN "HEIGHT OVER-ALL REAR"
1" WIDER THAN "WIDTH OVER-ALL REAR"
⅜" DEEPER THAN "DEPTH"

RECOMMENDED CABINET SPACING (MINIMUM): 7'6" CENTER TO CENTER "T" MODELS; 6'6" CENTER TO CENTER "TB" MODELS

Form RF-9

ROL-FOL TABLE, INC. *8467 Melrose Place • Los Angeles 46, California*

NOW IN USE
IN THOUSANDS OF SCHOOLS
FROM COAST TO COAST

FIRST INSTALLATION 1931

For a generation the Schieber equipment you see here has been in daily use in the Oliver Wendell Holmes Elementary School in Detroit. It has never required other than minor service.



The successful use of space for multiple purposes depends on the use of substantial, dependable and proved equipment and the selection of the proper type of equipment

SCHIEBER

Folding Tables & Benches

Patents 2131635 and 2203394. Other patents applied for.

SCHIEBER SALES COMPANY, DETROIT 39, MICHIGAN

E
/SC

SCHIEBER
IN-WALL
FOLDING TABLE AND BENCH UNITS



LEAPER & GILBERT, A.I.A. Architects

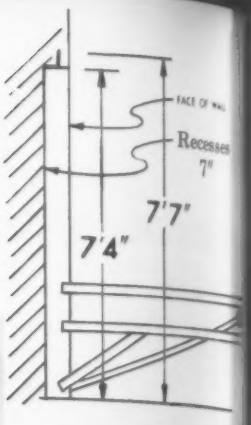
Highest Quality Unit Built

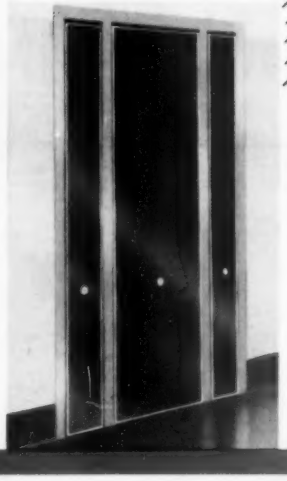
Thousands of these Schieber In-Wall units are now in use in practically every state and several foreign countries. Counter-balancing makes this strong, all-steel welded unit easily operated. This model was first in the line and is still first preference. Table and benches are not attached to each other and free access is afforded from the end. All edges are trimmed with stainless steel. Pockets are steel with full steel backs. Remains rigidly attached to wall pocket.





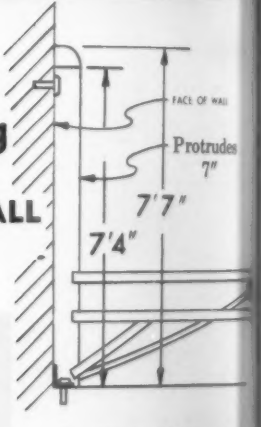
For New School Construction
• IN-THE-WALL TYPE

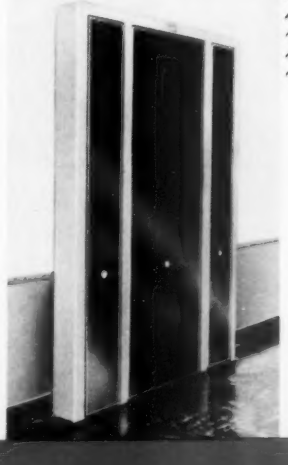




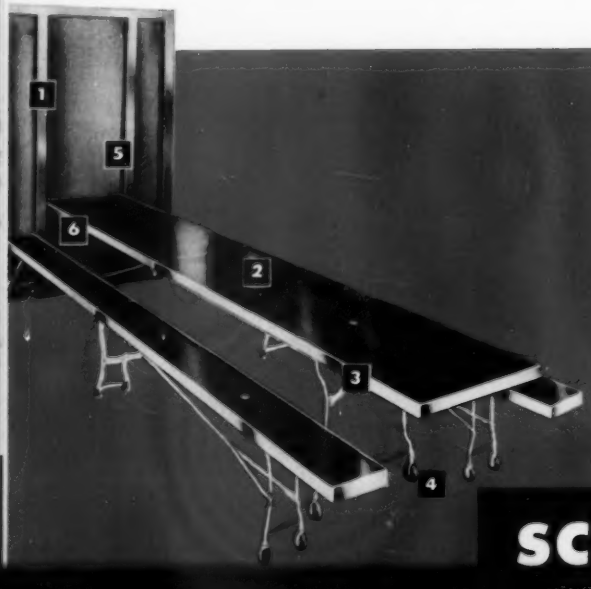
Consists of folding table and 2 benches. Seating capacity: 16 adults or 20 children. Installs flush with wall. Locks in folded position without danger of dropping. Removable key makes it tamper-proof. Also available as table unit only.

For Low Cost Remodeling
• AGAINST-THE-WALL TYPE





Consists of folding table and 2 benches. Seating capacity: 16 adults or 20 children. Anchors to wall, protrudes only seven inches. Locks in folded position without danger of dropping. Removable key makes it tamper-proof. Also available as table unit only.



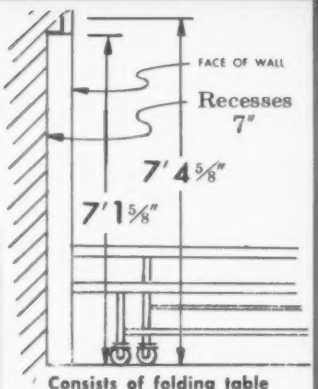
1. Substantial welded steel construction
2. Heavy, sanitary linoleum on top surfaces
3. Stainless steel trim on tables and benches
4. Mark-proof, silent bearing rubber casters
5. Fire-proof construction in every detail
6. Counterbalanced for easy roll-out and return

SCHIEBER SALES COMPANY

For New School Construction

● IN-THE-WALL TYPE



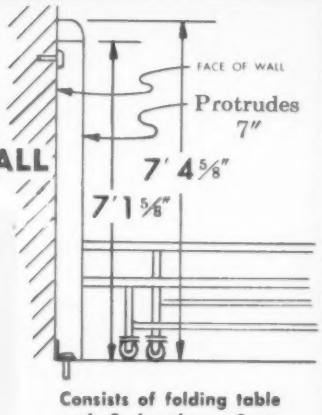


Consists of folding table and 2 benches. Seating capacity: 16 adults or 20 children. Installs flush with wall. Locks in folded position without danger of dropping. Removable key makes it tamper-proof. Also available as table unit only.

For Low Cost Remodeling

● AGAINST-THE-WALL TYPE



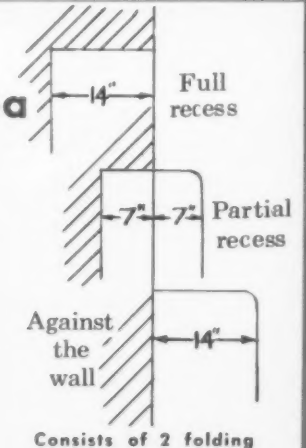


Consists of folding table and 2 benches. Seating capacity: 16 adults or 20 children. Anchors to wall, protrudes only seven inches. Locks in folded position without danger of dropping. Removable key makes it tamper-proof. Also available as table unit only.

For Restricted Wall Space Area

● DOUBLE DEPTH TYPE





Consists of 2 folding tables and 4 folding benches. All units detachable. Seating capacity: 32 adults or 40 children. Pocket may be fully recessed, partially recessed or mounted against existing wall.

SCHIEBER

PORT-A-FOLD

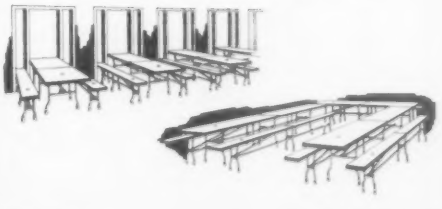
FOLDING TABLE AND BENCH UNITS



BUCHART ENGINEERING CORP., Architects & Engineers

Detach from the pocket

Now widely used because of their flexibility and lower cost. Engineered with the strength and quality that Schieber knows must be put into school equipment. All steel construction, except table and bench tops which are Philippine mahogany with top surfaces of serviceable Formica. Under sides are covered with smooth plastic backer sheets which, with formed reinforcing strips, prevent warping. Edges trimmed with permanently bright stainless steel.



Tables are not attached to benches and can be used separately.



NOTE THESE ENGINEERING ADVANTAGES



Stiffening bars—Each bench section has 4 longitudinal stiffening bars to handle maximum weights and making them the strongest benches on the market.



Automatic safety lock—Holds top of table in pocket until pulled out far enough to support its weight. Prevents accidents at time table is unlocked.

Strong linkage hinge —— Eliminates looseness and rattles of stamped hinge. Solid flush steel pin replaces cotter key.

Wide Bench Leg Span — Leg span has been increased 2" for added stability. ½" wall tubing is twice thickness of that generally used. Heavier spanner bar adds further to strength.



Universal pocket tracks —— Designed so tables and benches of any height can be returned to any pocket. Welded-on track has keyhole slot so hardened steel rollers cannot accidentally disengage.

No aluminum or plastic trim —Stainless steel trim is used on all tables and benches. Stays permanently bright. Will not smudge clothing nor hands. Pins driven through "T" insert prevent loosening and eliminate dirt collecting gaps.

New stronger stud anchors —New expansion studs, attach working parts. Have double the pull-test grip. No bolts run through table to cause bumps and depressions which "telegraph" through formica top.



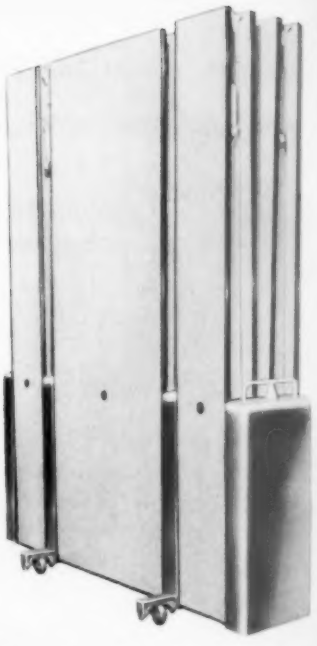
DETROIT 39, MICHIGAN

SCHIEBER

MOBIL-FOLD

FOLDING TABLES & BENCHES

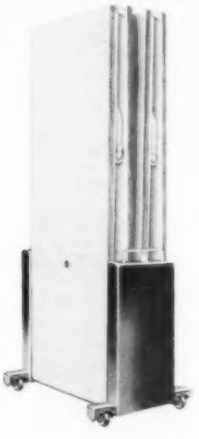




Mobil-Fold unit consists of two 12 foot tables and four benches with seating capacity of 28 adults or 32 children. Steel carrier is equipped with oilless bearing casters.

Schieber Mobil-Fold rolls to any location and can be used to supplement regular seating or where wall packets can not be installed. Tables and benches are not connected and can be detached from carrier for parallel setup where space is restricted making it completely flexible. Units are of Port-A-Fold type with sanitary Formica surfaces and stainless steel trim. Understructure is welded tubular steel.

Portable Auxiliary Seating



Mobil-Fold unit consisting of two tables only for locations where chairs are to be used for seating.



Tables and benches can be left attached for quick refolding or be detached from carrier.



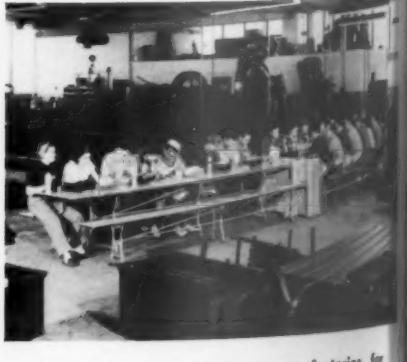
Tables are not attached to benches and can be used separately.



Increased enrollment has necessitated additional seating in this school. Mobil-Fold supplements wall pocket units, provides for rapid clearing of area after lunch hour.



When folded, unit stands six feet high for clearance through any door. Heavy casters are mark-proof and will not damage finished floors.



Mobil-Fold is used in many factories for lunch hour seating because it withstands rough usage and can be rolled out and rolled away in a matter of minutes.

LITHO IN U.S.A.
Form 13 M 55

SCHIEBER SALES COMPANY, DETROIT 39, MICHIGAN

BOONTON MOLDING COMPANY

Boonton, New Jersey

Boontonware

fine dinnerware fashioned of MELMAC®

Solid Colors to Mix or Match

POWDER BLUE GOLDEN YELLOW
SEA FOAM GREEN TAWNY BUFF STONE GRAY
COPPER ROSE FOREST GREEN CRANBERRY RED

PRACTICALLY UNBREAKABLE . . . Saves up to 90% of ordinary replacement costs. Eases the work load; less noisy in use. Enhances food appearance; keeps food hot or cold longer. Impervious to soap, detergents, food acids and boiling water. Stacks perfectly.

See your regular Supply House or write to us for name of your nearest Dealer.



OPEN STOCK SPECIFICATIONS

Standard Package contains same item, one color.

CODE NO.	ITEM	STANDARD PKG.	CARTON WT.
101	Grill Plate, 9⅜"	2 doz.	25 lbs.
102	Dinner Plate, 10"	2 doz.	23 lbs.
103	Dinner Plate, 9"	2 doz.	18 lbs.
104	Salad Plate, 8"	2 doz.	14 lbs.
105	Dessert or Sandwich Plate, 7"	2 doz.	10 lbs.
106	Bread and Butter Plate, 6"	2 doz.	8 lbs.
107	Individual Butter Chip, 3"	2 doz.	2 lbs.
201	Coffee Cup, 8 oz.	2 doz.	8 lbs.
202	Saucer, 6"	2 doz.	8 lbs.
203	Tea Cup, 6½ oz.	2 doz.	8 lbs.
204	Bouillon or Egg Cup, 7 oz.	2 doz.	7 lbs.
205	Mug, 10 oz. (C-11 Copolymer)	2 doz.	6 lbs.
206	Bell Cup, 8 oz.	2 doz.	8 lbs.
301	Individual Vegetable Dish, 5 oz.	2 doz.	7 lbs.
302	Dessert Dish, 7 oz.	2 doz.	9 lbs.
303	Soup or Cereal Dish, 10 oz.	2 doz.	11 lbs.
304	Nappy or Individual Salad Bowl, 16 oz.	2 doz.	11 lbs.
305	Deep Soup Dish, 15 oz.	2 doz.	13 lbs.
306	Nappy or Child's Cereal Bowl, 11 oz.	2 doz.	9 lbs.
307	Lug Soup or Salad Bowl, 16 oz.	2 doz.	13 lbs.
506	Sugar and Creamer Set	½ doz.	6 lbs.
604	Vegetable Serving Dish or Salad Bowl, 10"	1 doz.	16 lbs.
605	Divided Vegetable Serving Dish, 10"	1 doz.	18 lbs.
606	Platter, 14½"	½ doz.	11 lbs.
607	Service Platter, plain, 11"	½ doz.	6 lbs.
608	Service Platter w/cup partition, 11"	½ doz.	6 lbs.

CORNING GLASS WORKS

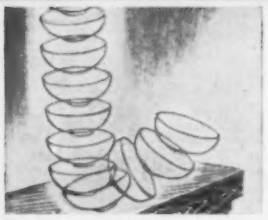
Consumer Products Division

Corning, New York





1. PROOF of sensational durability. Cups hammer 3-inch nails through heavy board without breaking.



2. SO TOUGH you can drop them without damage from a height twice as great as other ware. Cuts breakage.



3. 20% LIGHTER in weight than competitive ware. Easier to stack, handle and carry. Your help will like this.



4. WASHES EASILY. Double-Tough's hard, smooth surface comes thoroughly clean every washing.

Of Money-Saving -TOUGH DINNERWARE!



No Matter How Rough You Treat Them, They'll Cut Your Replacement Costs!

● **Ever since** this amazingly durable dinnerware was introduced, food servers have been urging us to fill out the line. Now, here it is—a complete set of CORNING *Double-Tough* Dinnerware!

● **Every** beautiful piece will put money in your till! Its durability is unmatched. Its beauty will last and last and last. No matter how tough your help and customers treat these pieces—you will **save** money on replacement costs!

NOW 21 DOUBLE TOUGH ITEMS

● **Twelve additions** have been made. Above is the entire line—twenty-one pieces of dinnerware and four styles of tumblers. Why not standardize on CORNING *Double-Tough* right now! See your authorized CORNING Double-Tough Equipment Dealer today!

CORNING DOUBLE-TOUGH

COMPLETE LINE OF DINNERWARE AND TUMBLERS

Made by the Makers of Famous **PYREX** *Brand Ware*

CONSUMER PRODUCTS DIVISION, CORNING GLASS WORKS, CORNING, NEW YORK.

"Corning," "PYREX" and "Double-Tough" are trade-marks in the U.S. of Corning Glass Works, Corning, New York

THE INTERNATIONAL SILVER COMPANY

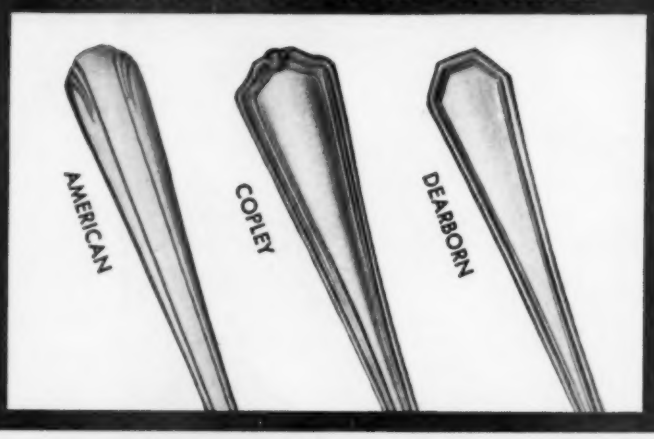
Hotel Division • Meriden, Conn.

INTERNATIONAL makes silver for every need!

To meet your flatware needs, International makes a pattern for every taste, a grade for every budget. Shown here are representative patterns in outstanding International lines of silverplate and stainless—each line the finest in its category.



INTERNATIONAL S. Co. XII TRIPLE



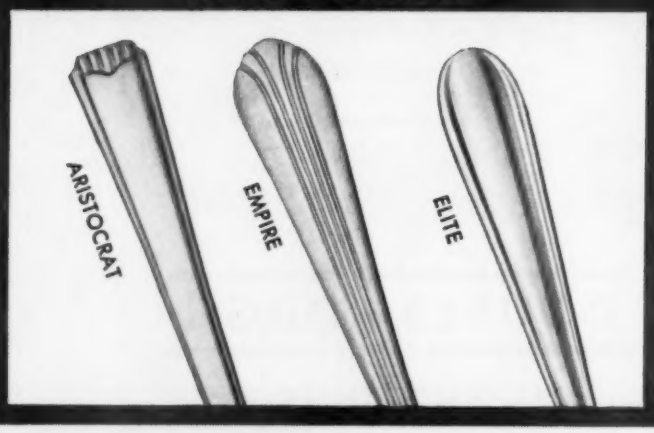
Superb design and finish, plus outstanding quality construction features, make this silverplate a favorite of better restaurants throughout the country. Rich appearance, high utility at a modest price.

VICTOR S. Co. I S



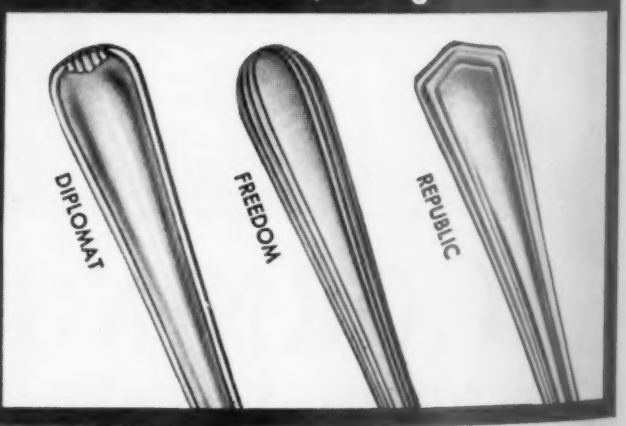
This is the outstanding budget-priced quality silverplate! Maximum serviceability and ease of maintenance at minimum cost. It is the ideal silverplate for the busy restaurant.

INSICO STAINLESS



Our finest stainless! Carefully grade-rolled in heavy gauge stainless steel for better balance, proportion, strength. Perfectly tempered—practically indestructible. Mirror finish. Available with regular 1-piece forged mirror finish knife or hollow-handled knife with forged cutlery steel blade.

SILCO STAINLESS (Now grade-rolled)

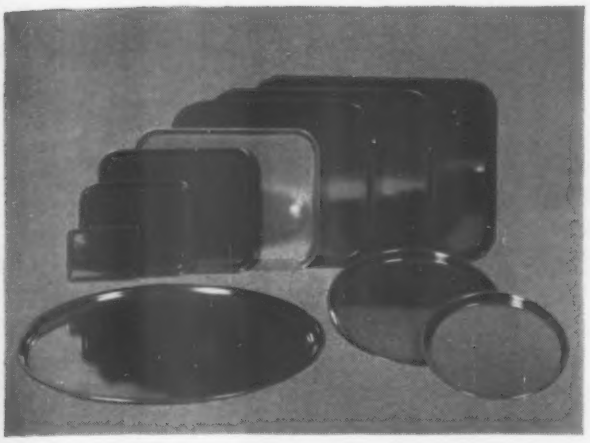


Silco, our high quality, low-priced stainless, is now grade-rolled for finer balance, proportion, strength. Extra value at no extra cost. Many more quality features usually found only in higher priced lines.

See *your* International Silver Company Certified Dealer

KEYES FIBRE SALES CORPORATION

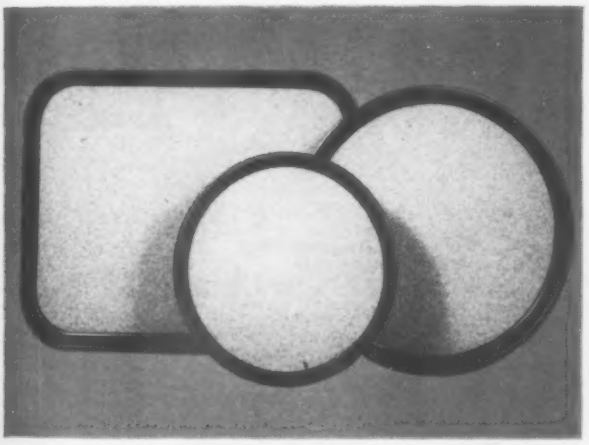
420 Lexington Avenue, New York 17, N. Y.



Handsome, lustrous KYS-ITE® molded plastic serving trays are lightweight and quiet, yet almost indestructible. They are non-corrosive, impervious to boiling and guaranteed not to warp. All sizes in brown or red colors.



KYS-ITE® molded plastic tableware has eye-appeal and keeps replacement costs almost at zero. Stain and break-resistant, it is lightweight and quiet, cleans easily, speeds up service, stays new-looking longer. Maple color.



KYS-ITE® cork-surfaced non-skid trays cut noise and breakage, avoid spilling. Impervious to boiling, guaranteed not to warp. The cork stays on because it is molded right into the plastic. Three sizes, brown and red colors.



ROYAL CHI-NET® is the finest paper plate line ever made. Gleaming china-white, each plate is individually molded for extra strength. The smooth, hard finish won't get soggy, flake or scrape off even with gravies or salad oils.

KEYES MOLDED PRODUCTS

Let us show you how these quality products will help you achieve a more efficient, more economical operation

SEAT-EAT INCORPORATED

1166 West Peachtree Street, N. W., Atlanta, Georgia

FOR YOUR CAFETORIUM

The SEAT-EAT *Convertable*



TABLE
Position 1



BENCH
Position 2

Table available in 30″ x 96″ and 30″ x 72″.
Heights from 27″ to 30″.

SEAT-EAT

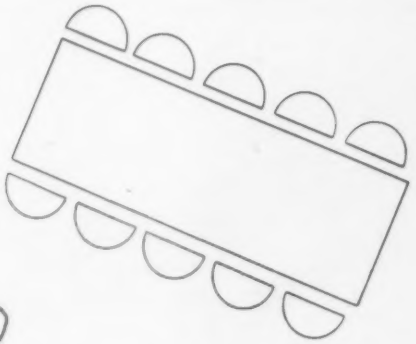
INCORPORATED

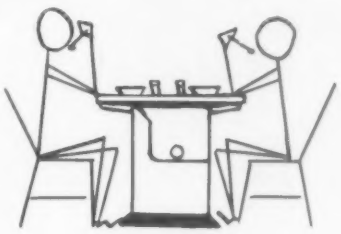
1166 WEST PEACHTREE STREET, N. W., ATLANTA, GEORGIA

POSITION 1
FOR CAFETERIA SERVICE

SEAT-EAT *Converts to Table*

Dining space for ten people at mealtime, using five chairs on each side. Blonde wood grain plastic top resists scuffing, heat and food acids.



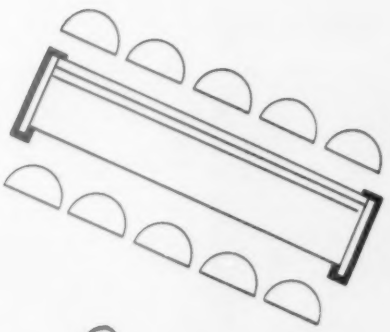


TEN EATING

CONVERTING



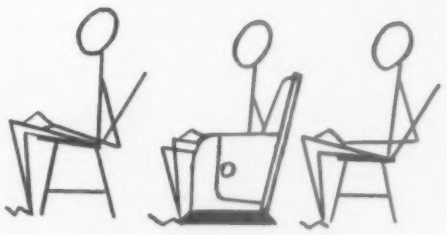
Seat-Eat becomes a bench with a flick of the magic lever. Easily converted by students.



POSITION 2
FOR GROUP ACTIVITIES

SEAT-EAT *Converts to Bench*

Restful, form-fitting seating for five additional people at group functions. Simply turn one row of chairs to face speaker and the transformation is completed in seconds.



FIFTEEN SEATING

TO CLEAR FLOOR

Remove chairs and swing Seat-Eat in bench form with back to wall, producing seating around the active area.

Seat-Eat can be supplied with casters with stationary position locks.

SEAT-EAT

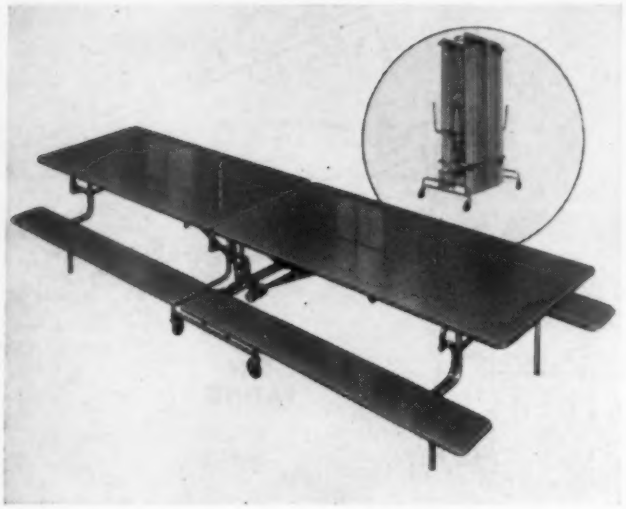
INCORPORATED

1166 WEST PEACHTREE STREET, N. W., ATLANTA, GEORGIA

Patent Applied For

SICO MANUFACTURING COMPANY, INC.

6045 Pillsbury Ave., So., Minneapolis, Minn.



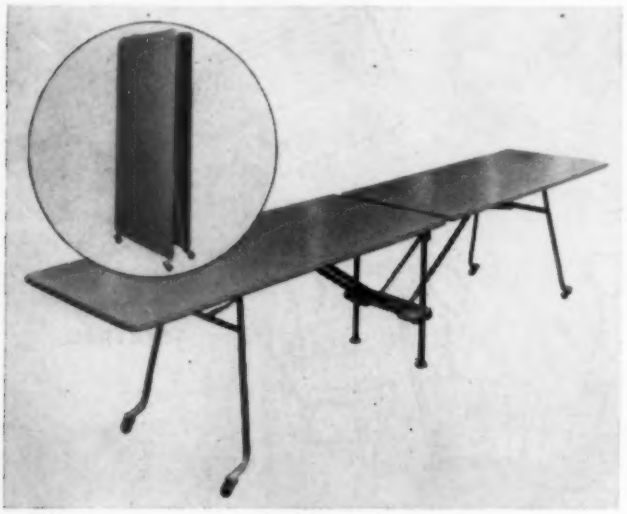
SICO B-Y

Rolling, folding table that easily seats 100% more people than ordinary table systems. Easy to use, Sico Floating Fold can be operated by a child. No hinges, locks or latches to pinch fingers or wear out. Seats 16 adults or up to 24 children.



SICO TIP-TOP

Ideal for use in confined areas. Saves at least 100% more floor space than ordinary tables. Seats 8 adults or up to 10 children. Simple, safe action makes it easy to move and store. Benches eliminate aisle blocking, other features reduce confusion and noise.



SICO L-B

Rolling, folding table with benches, ideal for banquets. Features SICO Floating Fold. Takes only 3 seconds to fold or unfold—cannot tip—does not bang floor. Table resists movement while in use. Rugged construction assures long life.



SICO 2100 TABLE TENNIS TABLE

At last an answer to the Table Tennis storage problem. When not in use, the Tuck-A-Way folds and glides easily out of the way. Designed for rugged day-in and day-out use. Folds or unfolds easily and instantly in one sweeping motion.

SICO SYSTEM OF TABLE SEATING

SEATS MORE PEOPLE AT LOWER COST

ASK FOR CATALOG NO. 55

E-2/An



COUNTER *Gas* EQUIPMENT

First CHOICE of LEADING OPERATORS for TASTIER FOODS SERVED FASTER



COUNTER FILTER-FRYER FRIES OVER 30 LBS. of WEIGHED RAW POTATOES to FINISHED FRENCH FRIES IN AN HOUR.

New smooth, streamlined design allows tight banking. Sparkling stainless steel cabinet and smooth inside of kettle, with no obstructions, makes cleaning easy. New powerful burner with greater efficiency swiftly recovers the temperature drop in cold loading. Keeps fat temperature right at the peak for best frying results. Uses only 12 lbs. of frying fat, yet produces more orders than fryers twice its size. Large twin basket capacity. Has Anets exclusive crumb tray that collects crumbs and burnt particles. Easy to lift and dump out to keep fat cleaner and clearer for many more fryings. Made with steel radiants welded to outside of kettle and enclosed combustion chamber to increase heating area and accelerate frying speed. Write for Bull. No. 210 for full details. Model MCG-11″ x 11″; Overall size 14″ wide x 23½″ deep. Fat capacity 12 lbs. Shipping weight, 70 lbs.



NEW COUNTER FOOD-WARMER KEEPS FOOD WARM AND APPETIZINGLY FRESH for FASTER SERVING at RIGHT TEMPERATURE

Keeps meat, vegetables, soups, gravies, roasts, etc., at correct selected temperatures for instant serving. Designed for dry or wet heat operation. Made to take round inserts as shown, or to take many combinations of stainless steel pan inserts. Can be equipped with steam hood as shown for bun freshening and warming. See sketch B. Top opening of 11⅞″ x 19⅞″. Temperature range from 140° to 200° settings. Compact and space saving. Only 14″ wide x 23½″ deep. Matches and banks tight with other Anets counter equipment. For full information, write for Bulletin No. 215. Model FWS-6, B.T.U. Input, 6,000. Shipping Weight, 45 lbs.

ALL SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE

COUNTER HOT-PLATE

Performs a variety of fast operations. Has giant size burner with hi-lo and simmer valve and standard size burner with hi and low valve. Permanent pilot. Stainless cabinet. Deep aluminum splash pan catches drippage and spillovers. Burners easy to remove for cleaning. Larger special grid holds smallest frying pan or heavy stock kettle. Model HP-2, Size 14″ wide x 23½″ deep. Shipping Weight 35 lbs. Write for Bulletin No. 189.



New 14" and 18" Filter-Fryer

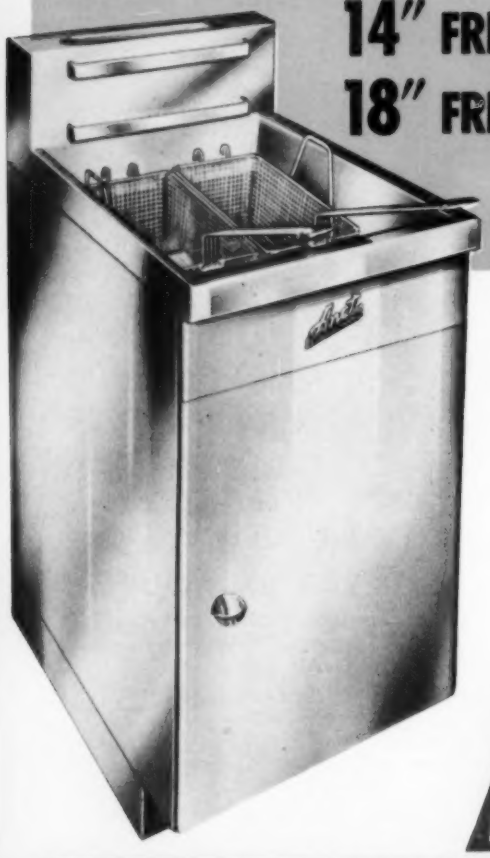
SET NEW PRODUCTION RECORDS that are OUTSTANDING!

14" FRIES OVER 60 Lbs. of Potatoes

18" FRIES OVER 75 Lbs. of Potatoes

...FROM RAW to FINISHED FRENCH-FRIES PER HOUR





NEW MODEL NFS-2 14" FILTER-FRYER

A NEW hi-speed design for heavy duty production. New streamlined stainless steel kettle with more heat transfer radiants is powered by four special designed burners that flash "ON" to full power to prevent temperature drop and "OFF" at exact temperature to stop overheating. Cool-operating at hi-speed. New lift-out tray to dump crumbs and keep fat cleaner and clearer. New enclosed cabinet and flue design increase efficiency. Safety pilotstat equipped.

OVERALL SIZE 16⅞" Wide, 25¾" Deep and 33½" High. Maximum B.T.U.input 80,000.

Shipping Weight 180 Lbs.

LOOK AT THE CRUMB the Filter-Frye TRAY COLLECTS

Fat rotates from sides of kettle and de depositing crumbs on tray for easy lift out disposal. Keeps fat cleaner and clearer many extra fryings. Only Anets fryers have simple, fast and sanitary method of disposal.



TEMPERATURE IS ALWAYS UP AND READY FOR THE NEXT COLD LOAD

INSTANT RADIANT RED-RAY BROILER



BROILS BOTH SIDES of MEAT at SAME TIME

Anets NEW INFRA-RED RAY BROILER is astounding operators with its speed. Takes only 3 minutes to preheat. Broils delicious medium sized steaks in only 5 minutes. Chops, fish steaks, lobster, ribs, chicken and hamburgers broiled in record time without turning food. An intense barrage of infra-red rays pierce thru the meat and break down the tissues to insure juicy, tender foods with that broiled taste. Seals in natural juices and cuts shrinkage to a minimum. Entire cabinet, inside and out, splash plates, burners with radiants, made of stainless steel. Grill and broiler plate of nickel alloy steel plate.

Two sizes, BR-14" wide and BR-24" wide. Equipped with separate control valves for top and bottom burner and a master "ON" and "OFF" gas control valve. Has hidden grease drain drawer. Write for Bulletin No. 190.

Model	Overall Size
BR-14	14" W x 25½" D
BR-24	24" W x 25½" D



ALL SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE

MODEL FGS-18" FILTER FRYER for HEAVY DUTY PRODU

This newly designed 18" fryer uses only 50 lbs. of f out over 75 lbs. of French fries per hour. More of oth foods. Its four big burners are safety pilotstat contro added automatic safety feature. Larger heating area precision thermostat increase usable heat and frying Overall size: 20⅞" wide, 32" deep. B.T.U. Input, Shipping Weight 210 lbs.

THERMOSTATICALLY CONTROLLED . . .

GRILLATOR



Operators with LITTLE . . . OR NO EXPERIENCE can FRY the THICKEST STEAKS or BIG ORDERS of HAMBURGERS, HOT CAKES and OTHER FOODS to TASTY GOODNESS in NEW RECORD TIME.



You've never experienced true grilling satisfaction until you've operated an Anets Grillator. The heat transfer of the heavy ½" nickel alloy steel plate is so perfectly uniform that load after load of wheat cakes are turned out to the same golden color and well done goodness. Just dial the thermostat to the temperature each food requires. It's quickly done to a turn with natural flavor and juices retained. New streamlined design allows tight banking. New sanitary grease trough in front is easy to keep clean.

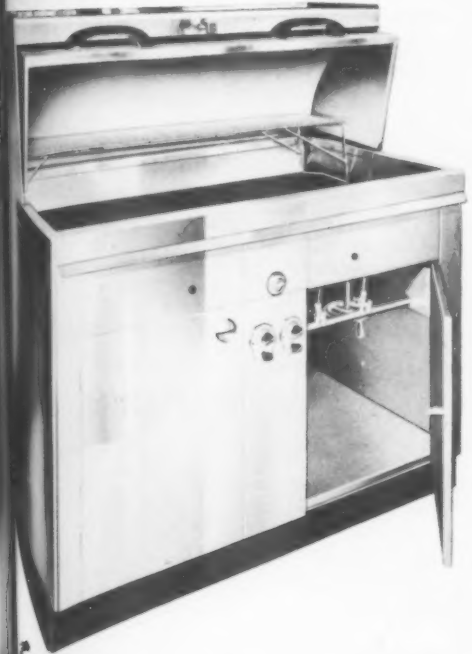
Streamlined in Stainless Steel

Cabinet, rims and back splash are smoothly designed in sparkling stainless steel. Adds eye appeal that attracts and holds customers. Air flow design of rims dissipates heat and prevents fat creepage. Rims and back splash electrically welded to plate so there is no fat seepage. Famous for its ability to handle the heaviest cold loads without faltering. Famous for its precision temperature control. For full details, write for Bulletin No. 189.

Max. B.T.U. per burner 14.500.

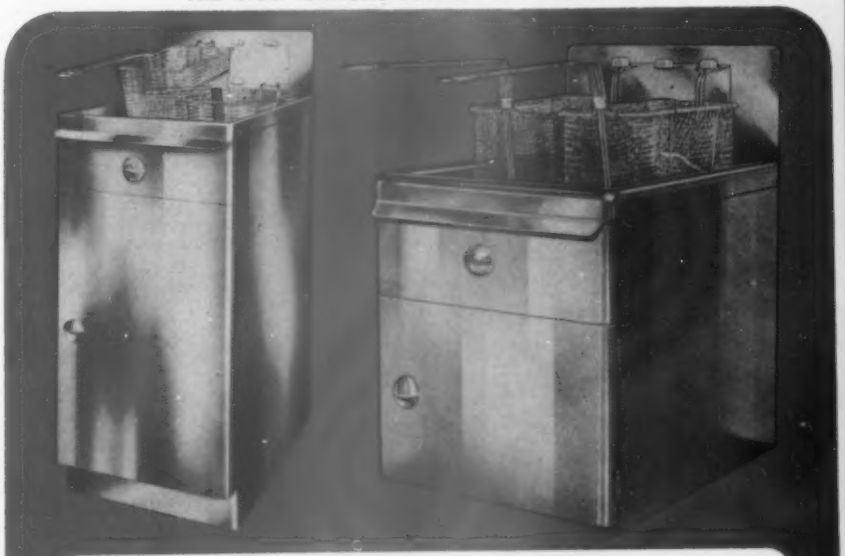
Model No.	Size of Plate	Over-all Width	Over-all Depth	Height to Rim	Height to Back-Splash	No. of Burners	No. of Thermostats	Ship. Wt.
G-28	19"x22"	28"	23½"	11⅝"	15"	3	1	150 lbs.
G-36	19"x34"	36"	23½"	11⅝"	15"	4	2	213 lbs.
G-42	19"x40"	42"	23½"	11⅝"	15"	5	2	250 lbs.

ALL SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE



FAMOUS DEEP PAN FRIED CHICKEN
IS THE ANSWER TO BIG PRODUCTION

Uses only 20 to 30 lbs. of fat. Simple to use. Elevating tilts kettle from level to 2" pitch. Set one thermostat pre-cooking and the other for finishing temperatures. the chicken pieces at one end, close the steam hood. the chicken to the opposite end and put in a fresh for continuous production. Serve orders from warming Cabinet, steam hood and kettle sides are of stainless Write for Bulletin No. 212 for details. Size 45-5/8" x 27-5/8" deep and 48-1/2" high. Max. B.T.U. input Shipping Weight, 425 lbs.



Filter-as-you-Fry to SAVE FAT and SERVE TASTIER FOODS that ATTRACT and HOLD CUSTOMERS

The floor and counter models shown above are speedier than ever. They fry 30 lbs. of weighed raw potatoes to finished french fries per hour. Temperature is always up, ready for the next load. Steel radiants welded to bottom of kettle increases heat input for faster recovery. Smooth inside of kettle with no obstructions make cleaning easy.

MODEL	WIDTH	DEPTH	HEIGHT	MAX. B.T.U.	FAT CAP.	SHPG. WT.
FGS—11" Floor	13⅜"	17⅛"	33½"	30,000	18 lbs.	100 lbs.
CGS—11" Counter	13⅜"	17⅛"	21¾"	30,000	18 lbs.	70 lbs.
FGS—14" Floor	16⅜	25¾"	33½"	62,000	28 lbs.	165 lbs.

Anets NEW BUN PAN SIZE DONUT Filter-Fryer



USES ONLY 65 LBS. OF SHORTENING AND SAVES UP TO 80 LBS. AT EVERY FILLING

Turns out approximately four dozen 2½" diameter yeast raised donuts per tray load. Takes 17½" X 25½" tray. Also used to fry fish, shrimp and chicken. One installation of this unit produces 1200 lbs. of fish steaks in eight hours. They were frozen solid when put in the fryer. Despite this extreme cold load the fat temperature was recovered so that a new cold load was processed every 2½ minutes. That's frying speed that only Anets BFG-18" X 26" Filter Fryer can give you. Besides the big fat saving in each initial loading, no fat has ever been thrown away. Think of the huge fat savings possible. Put it to work for you frying donuts, fish, shrimp, clams, chicken, etc.

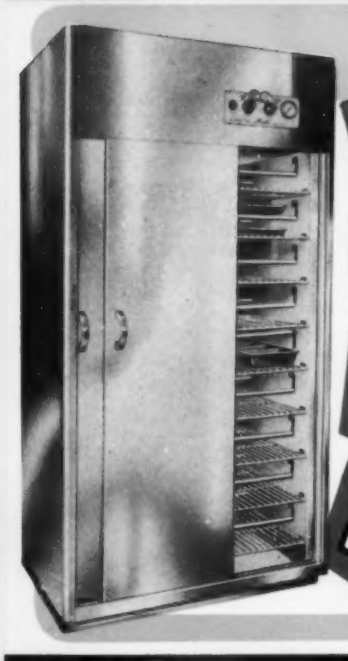
SMOOTH INSIDE OF KETTLE IS EASY TO CLEAN.

No tubes or obstructions inside the smooth kettle make cleaning easy and fast. Forty-eight steel radiants are electrically welded to sloped outside of bottom of kettle to increase the heating surface for faster heat recovery and bigger frying production.

SPECIFICATIONS OF MODEL BFG-18" X 26". Fully enclosed cabinet with fold-over drain board. Heavy gauge steel kettle takes 17½" X 25½" tray. Heavy duty 1" gate drain valve. Width 24", Depth 38", Width, including drainboard 44". Complete equipped with three trays, one crumb tray and one lift-out tray cradle. Write for bulletin No. 107 for full details. Approximate shipping weight 275 lbs.

FAT KEPT CLEAN with FILTER TRAY

Fits right in bottom of kettle. Has perforated strainer in middle. Fat rotates from sides of kettle to center. Deposits crumbs and flour accumulations on tray. Just lift out tray and empty. It keeps fat cleaner and clearer.



YOU SAVE MONEY WITH CONTROLLED PROOFING AND PRODUCE BETTER QUALITY BAKED GOODS.

IMPROPER PROOFING CAUSES 25% OF DEFECTIVE BAKED GOODS. ——— say practical bakers who must have controlled proofing to eliminate waste. Each type of dough requires a different temperature and humidity accurately controlled to produce the best volume and uniformity of product. Anets Air Conditioned Cabinet Proof Boxes offer the best solution to eliminate waste and turn out a quality product every day.

MODEL SR-170 IN STAINLESS STEEL WITH AUTOMATIC AIR CONDITIONER

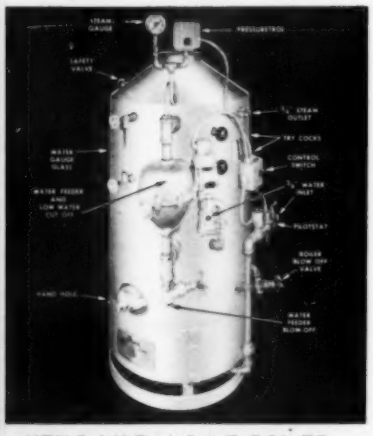
Made with full ½" metal-clad sealed-in insulation. Has patented, removable sliding doors. Patented Rol-A-Way rods double capacity when used for buns or rolls. Model illustrated has Automatic Steam Coil Air Conditioner.

CAPACITY. 170 one-lb. loaves with the shelves spaced 5¼" apart or 36 bun pans size 18" X 26" spaced 3" apart. Has nine heavy duty shelves size 27" X 40".

OVERALL SIZE: Width 44", Height 87", Depth 32". WRITE FOR BULLETIN No. 101 FOR OTHER SIZE MODELS.



WRITE FOR THIS FREE BOOKLET THAT TELLS THE WHAT AND HOW OF CONTROLLED PROOFING. ASK FOR OUR PROOFING BOOKLET.



NEW 2-4 H.P. A.S.M.E. BOILER WITH AUTOMATIC CONTROLS. Provides an economical low pressure steam for oven, proof-box, steam kettle, vegetable steamer, etc. Built to A.S.M.E. code. Tested and certified by boiler insurance inspectors. Write for bulletin No. 117.

Anets NEW MIDGET BENCH SHEETER

MODEL MDR-4C

Sets on top of your work bench. Eliminates laborious hand work...5 to 6 times faster too! Sheets all types of doughs for sweet goods, pies and Pizza pie doughs to a smooth uniform thickness. Eliminates the punishment of hand-rolling. Keeps the doughs tender and alive for a better baked product. Precision-ground rollers open from 0" to 1" and are 18" wide to take larger dough pieces. Easy to operate. Plugs into 110 volt A.C. outlet.

OVERALL SIZE: Width 27½", Length 27½", Height 15¾". Motor ¼ H.P., 1725 R.P.M. Roller speed 60 F.P.M. Shipping Weight approximately 250 lbs.



ANETSBERGER BROTHERS, INC.
185 N. ANETS DR., NORTHBROOK, ILL.
PHONES: NORTHBROOK 770—771—772

Market Forge STEAM COOKERS



Market Forge Steam Cookers provide the best in food service and efficiency. The complete line of steam cookers shown on these pages includes — **COMBINATION UNITS** — gas or electrically operated for the kitchen without direct steam that needs a steam jacketed kettle and a pressure cooker. **COUNTER MODEL PRESSURE COOKERS** for the smaller restaurant or the specialized kitchen. These are available for operation with gas, electricity or direct steam. **COMPARTMENT TYPE STEAM COOKERS** for the large kitchen. Direct Connected (2, 3 or 4 compartments) for the installation where direct steam is available. Gas or electrically operated (two compartment only) for the kitchen that does not have direct steam.

MODEL ST-KG
Gas Operated Combination Unit

This unit provides a Direct Connected Steam-It Pressure Cooker and a 20-gallon direct connected steam jacketed kettle. Pressure cooker has a capacity of three 12" x 20" x 2¼" deep standard size cafeteria pans (one half bushel cooking capacity). Steam is furnished by a two-H.P. ASME gas fired boiler complete with controls located in the cabinet.

MATERIAL — *Kettle*, stainless steel; *Cabinet*, stainless steel; *Pressure Cooker*, stainless steel with aluminum cooking cylinder. Overall dimensions: Width 45½", height 58", depth 31⅜". Gas, water and drain connections required.

MODEL ST-KE
Electrically Operated Combination Unit

This unit is the same in size and appearance as the model ST-KG as shown above. In the electrically operated combination units steam is furnished by a 24 KW boiler. Boiler is automatically controlled by pressure regulator, and water feeder. 208/240-three phase-60-cycle power, water and drain connections required.



MODEL ST-S
Direct Connected

The Direct Connected Steam-It provides a single compartment pressure cooker that will operate at fifteen pounds pressure from steam supply available on the premises. Steam-It has a capacity of 3 12" x 20" x 2¼" deep standard cafeteria pans. Steam Control is synchronized thermostatic with ½" steam supply and exhaust valves.

MATERIAL — Stainless steel with 3/16" aluminum cooking cylinder. Dimensions: Width 18½", depth 30", height 28". Steam and drain connections required.



ST-E AUTOMATIC ELECTRIC STEAM-IT

The Market Forge Electric Steam-It provides a single compartment automatic pressure cooker with a capacity of 3 12" x 20" x 2¼" deep standard cafeteria pans. The power is controlled to maintain pressures up to 15 P.S.I. The complete cooking cycle is controlled by the timer.

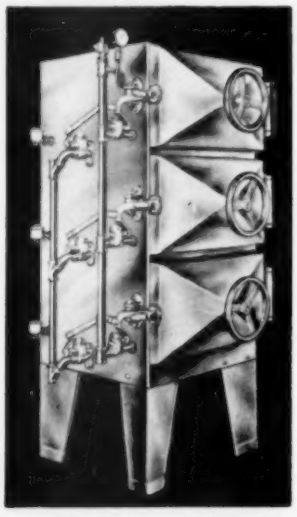
MATERIAL — Stainless steel with 3/16" aluminum cooking cylinder. Dimensions: Width 18½", depth 30", height 28". 12 KW 208/240-single or 3-phase 60-cycle power is only connection required.

ST-AG AUTOMATIC GAS STEAM-IT

The Market Forge Gas Steam-It provides a single compartment automatic pressure cooker with a capacity of 3 12" x 20" x 2¼" deep standard cafeteria pans. Fuel input (25,000 B.T.U.) is controlled to maintain pressure up to 15 pounds. The complete cooking cycle is controlled by the timer.

MATERIAL — Stainless steel with 3/16" aluminum cooking cylinder. Dimensions: Width 18½", depth 30", height 28". ½" gas (25,000 B.T.U.) 110 Volt electric connections required.

Steam Cooking Saves– SPACE-TIME-LABOR FUEL and FOOD VALU



MODEL 3M-TSS

Direct Connected 3 Compartment Steam Cooker

This unit provides approximately 6 bushels of steam cooking capacity where direct steam is available. This steam cooker is equipped with synchronized thermostatic control. Doors are provided with stainless steel interiors, one piece gaskets that may be replaced without cementing, acme type door wheel screws, bronze screw bushings, and insulated outer door. The overall dimensions are 35" wide, 32" deep. Height Model 2M two compartment 50". Model 3M three compartment 60" and Model 4M four compartment 71". All sizes are available with stainless steel interior and enamel exterior or polished stainless steel exterior. ¾" Steam (34.5# per compartment) connection and 1" drain line to open sink or floor drain.



SPECIFICATIONS
Seamed Basket

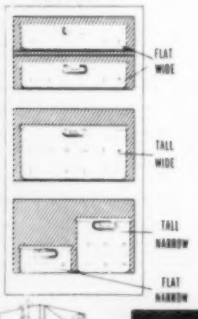
Baskets formed from 24 gauge stainless steel with corners lap seamed and spot welded and top edge rolled over ¼" stainless steel wire.

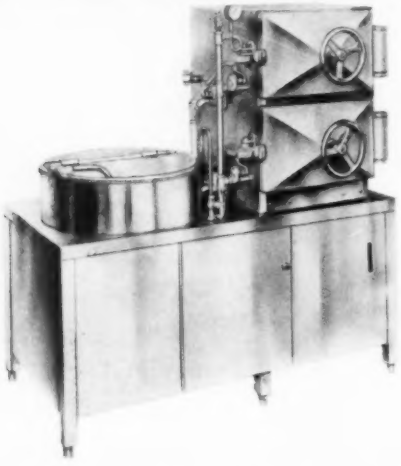


SPECIFICATIONS
Seamless Basket

Baskets drawn from one piece 20 gauge 18 & 8 stainless steel, providing rounded corners and a satin sanitary finish inside and out.

BASKETS





MODEL 2M-KG

Gas Operated
Steam Cooker and 40 Gallon Kettle

This combination provides a 2 compartment, 4 bushel steam cooker and a 40 gallon kettle. The unit requires only one ¾" gas (150,000 BTU) ½" water and 1½" drain connection for both pieces of equipment. It is complete with all necessary controls, and has a stainless steel table top which drains the condensate to one common point thus eliminating the necessity for a tiled curb or recessed flooring. The unit is equipped with a 2.8 HP boiler which provides enough steam to bring 40 gallons of water to a boil in one half hour or less. Overall dimensions 64" long, 34" deep and 63" high. Available with stainless steel interior with enamel exterior or polished stainless steel exterior.

MODEL 2M-KE

Electric Operated Steam Cooker and 40 Gallon Kettle
Specifications same as for gas model shown above except: 24-KW boiler
Requires one power (24-KW), ½" water and 1½" drain connections.

MODEL 2M-KS

Direct Connected Steam Cooker and 40 Gallon Kettle
Specifications same as for gas model shown above except:
Steam connection is to existing supply.



MODEL 2

Gas Operated
2-Compartment Steam

This Market Forge Steam
a capacity of approximately
The overall dimensions are
34" deep and 66" high. Ste
is from a 2 HP boiler loca
base. Unit is available with
steel interior and enamel e
polished stainless steel ex
gas (100,000 BTU), ½" wat
tion and 1" drain line to
or floor drains required.
done in baskets (perforated
designed to be used with
cooker.

MODEL 2M

Electric Operated 2-Compartment
Cooker
Specifications same as for
shown above except:
18-KW boiler
Requires one power (184
water and 1" drain line to
or floor drains.

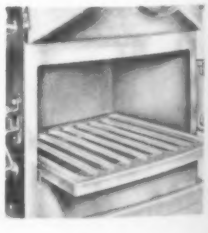
MODEL 2M

Direct Connected 2-Compartment
Cooker
Specifications same as for
shown above except:
Steam connection is to existing

AUTOMATIC SLIDING STAINLESS STEEL SHELVES

Automatic Sliding Stainless Steel Shelves, one piece die formed, will pull out when doors are opened. Makes hot baskets accessible without reaching into compartment.

Intermediate Removable Stainless Steel Shelves, one piece die formed, permit the use of additional shallow or flat baskets. Available for all models. Also available as an intermediate shelf.







Market Forge Company
Food Service Division,
EVERETT 49, MASSACHUSETTS









Metal Craftsmen MAFORCO ... Since 1897



VERMIN PROOF SHELVING AND BINS

For Dry and Bulk Storage

The storage of canned goods, bulk foods and miscellaneous general storage requirements in hospitals and institutions cannot be properly handled with ordinary type commercial shelving and rack equipment. The MARKET FORGE COMPANY has designed, as a result of study of the general requirements, a type of shelving and bins which may be arranged to suit any and all general requirements. The shelving is completely sanitary and adjustable. Bins in a satisfactory range of sizes for every purpose are available. All bins are completely vermin and dust-proof.

Fronts are provided with card holders for suitable identification. Front edges of shelves are furnished with or without label holders.

All equipment is made of galvanized material as a protection against corrosion and finished in enamel or aluminum bronze to suit requirements.

The wide range of storage requirements encountered makes it impossible to cover every possible adaptation. We illustrate a typical installation and suggest you consult the MARKET FORGE COMPANY without obligation. We proffer complete layout and specification service along with budget estimates.

DETAILED SPECIFICATIONS

TOP SHELF SECTION — Top, back and end enclosures are of No. 20-gauge galvanized steel. Partitions are double thickness No. 20-gauge galvanized steel with cover strips of same gauge. Shelves are of No. 18-gauge galvanized steel flanged down on all sides with corners welded. Shelf supports are adjustable pilaster type with slots on 1 in. centers provided with adjustable and removable spring clips, thus providing for adjustment of shelves of 1 in. increments. Be sure to specify number of removable shelves required per top section. Recommended standard — three shelves.

LOWER BIN SECTION — Counter top of No. 12-gauge stainless steel, No. 4 finish or of same gauge galvanized steel with 2-in. rolled rim along front closed at ends. Frame is of 1½ x ½ x 3/16 in. angles entirely enclosed except for bin openings with No. 20-gauge galvanized steel. Legs are of 1¼-in. pipe, welded to angle iron frames fitted with adjustable cone feet for leveling.

Bins — Lower bins are normally 22 in. wide, 21 in. high, 15 in. front to back. These are made of No. 14-gauge black steel, all welded, hot dipped galvanized, with rounded front. Bins are pivoted at the bottom so that they may be tilted forward and are provided with suitable stop at the rear. Each bin is fitted with solid brass pull handles, nickel-plated, with index card holders. Bins are readily removable for cleansing. Upper bin sections are approximately 10 x 10 x 10 in. It is the recommended practice to have two small bins to line up over the one larger lower bin. Recommended alternate bins to be made of No. 16-gauge stainless steel polished No. 4 finish.

DIMENSIONS — Overall length to suit requirements and also contour of room to be equipped. Top shelf sections are generally 12 in. wide with recommended alternates 15 and 18 in. Counter top is generally 12 in. wider than the top shelf section. Floor to top of counter 42 in. Counter to top of top shelf section 4 ft. 6 in. Floor clearance 5¾ in.

FINISH — Where other than stainless steel is specified, galvanized metal should be properly prepared to take enamel finish in color specified. In the absence of definite specifications, dark green baked-on enamel will be furnished.

MARKET FORGE COMPANY · EVERETT STATION BOSTON, MASSACHUSETTS

Metal Craftsmen ... Since 1897



Stainless Steel Shelving



Galvanized Steel Shelving



Portable Stainless Steel Shelving

"MAFORCO" WALK-IN REFRIGERATOR EQUIPMENT

Storage Equipment for Refrigerated Spaces

Specialists in the manufacture of shelving and rail racks for refrigerated spaces. Galvanized slatted shelving has been the accepted standard of excellence for many years. This metal equipment with reasonable maintenance will serve satisfactorily for the lifetime of most buildings. Specify this modern equipment especially designed and manufactured by experts in this field.

SPECIFICATIONS

"Maforco" Shelving

Medium Duty — The posts are 1¼ in. outside diameter high carbon steel tubing. Brackets are malleable iron rigidly fixed to posts by means of setscrews. Shelves are continuous frames of high carbon steel angles, in sizes to suit loads imposed, double-riveted at corners. At eight points in each shelf at corners, the horizontal leg of shelf angles is to be die-formed so as to wedge tightly into shelf bracket, thus providing a rigidly self-supporting unit without use of bolts, nuts or other means of fastening. Slats are to be 1 in. x 12-gauge x 1 in. apart, flush riveted to frames with all edges well rounded and chamfered. This slatted construction permits a free circulation of air. Shelf sections should not be longer than 6 ft. Posts are to be neatly finished at top with ornamental acorns and with pressed steel self-leveling floor flanges.

Heavy Duty — Exactly identical to Medium Duty equipment, excepting that posts are standard 1¼-in. iron pipe size with semi-steel cast brackets.

Rail Racks

Medium Duty — 1¼-in. standard pipe for spans not more than 5-ft. centers.

Heavy Duty — 1½-in. pipe for spans not more than 4-ft. centers.

Brackets, Posts, Hooks, Etc. — Brackets are available for the three sizes, providing flush mounting with 3, 6, 9 and 12-in. projections from face of the posts. Rails are 1½ x ⅜-in. steel for light duty and 2 x ⅜-in. steel for medium and heavy duty Removable hooks should be furnished for every 6 in. of rail — 5/16 and ⅜ in. for light duty and ⅜ and 7/16 in. for medium and heavy duty. Posts in every case are to be expanded between floor and ceiling and equipped with self-expanding ceiling flanges and self-leveling pressed steel floor flanges. Rail rack brackets are to be of heavy gauge pressed steel, die-formed, with reinforcing ribs top and bottom edges, and are to be adjustable and removable without moving the posts. Hooks only are to be of mild steel tinned finish. Recommended alternate on hooks — stainless steel.

Self-supporting rail racks are desirable where suspended ceilings do not permit the use of posts-to-ceiling construction. These are available in single or double rail design rigidly constructed to stand on legs with full size floor flanges free from wall or ceiling attachment. Frames are 1¼" standard pipe suitably braced and rails may be two, three or four high. Frame should be located on not more than 4'-0" centers.

Unless otherwise specified, all equipment is to be furnished hot dipped galvanized after fabrication.

"Maforco" equipment conserves valuable refrigerated space. It fits snugly into corners, around projections so as to utilize every inch of available space. All equipment is rigid and self-supporting and does not have to be fastened to refrigeration construction.

Stainless Steel Shelving

Wherever possible, we urge the use of stainless steel shelving and rail racks. The maintenance is reduced to the absolute minimum because cleaning can be simply and readily effected. The bright permanent finish promotes cleanliness and orderliness.

The general construction is the same as the galvanized equipment with the exception that the shelves are of solid #14 gauge material with integral die-formed slats.

Write for detailed specifications and mechanical drawings. These are available without obligation.

General Notes

Shelves are built as wide as conditions require but we do not recommend over 36 in. and a good standard is 24 in. for all general purposes. Shelves less than 18 in. in width are frequently used where door returns require the narrow shelves to avoid projecting into the door opening. In designing refrigerator boxes, it is well to bear in mind the location of the doors with this condition in view.

Meat storage boxes should be specified four or five shelves high. Vegetable and dairy storage boxes, three or four shelves high.

Where stainless steel is required for shelving, we recommend that the shelves only be of stainless steel and in such cases where posts and brackets are required in stainless steel, we recommend that only the light type of construction be used.

It is also generally considered desirable to specify that the back edges of all shelves be furnished with a stop ledge to prevent stored foodstuffs from being pushed back against the wall of the refrigerator. This is not standard and should be definitely noted, if required.

WRITE FOR DETAILS ON NEW TYPE STAINLESS STEEL SHELVING

MARKET FORGE COMPANY · EVERETT STATION BOSTON, MASSACHUSETTS

E 2/NA

NOW... hot meals in all schools from one kitchen with NACO portable ELECTRIC FOOD CARTS



Model H. C. P.

NACO lowers your food service costs... keeps food hot or cold, fresh, and delicious.

...w you can prepare food in ...e central and economical ...tchen; then deliver and serve ...t meals to every school.

Manufactured by the makers of famous Atlas Food Service Equipment

NATIONAL CORNICE WORKS

ESTABLISHED 1911

1323 CHANNING STREET, LOS ANGELES 21, CALIFORNIA

Check the features of the NACO



Smaller school districts

can now centralize their kitchens

and save considerably while

benefiting all students

wer your operating costs with NACO...only NACO allows one kitchen to do the job of many

Among users of Naco Portable Food Carts is the Norwalk (California) School District who recently bought these fifteen carts to bring the advantages of warm meals to their pupils without installing separate kitchens in each school.



for economy and efficiency investigate

NACO

portable

ELECTRIC FOOD CARTS

let ONE kitchen do the job of MANY with NACO!

PLENTIFUL FOOD CAPACITY WITH EACH NA

SECTION	"A" CONTAINER	UNIT CAPACITY	QUANTITY	"B" CONTAINER	UNIT CAPACITY	QUANTITY	TOTAL "A" CONTAINER	
1	#165	5⅞ Qt.	6	#1654	9⅛ Qt.	6	35¼ Qt.	55
2	#4798	8 Qt.	6	#4798	8 Qt.	6	48 Qt.	48
3	#165	5⅞ Qt.	6	#1654	9⅛ Qt.	6	35¼ Qt.	55
4	#165	5⅞ Qt.	6	#1654	9⅛ Qt.	6	35¼ Qt.	55

Note: *Not* equipped with serving pans or fireless cooker pots.

For further information, consult your architect, food service equipment supplier, or National Cornice Works.

Manufactured by the makers of famous Atlas Food Service Equipment

NATIONAL CORNICE WORKS

ESTABLISHED 1911

1323 CHANNING STREET, LOS ANGELES 21, CALIFORNIA

Printed in U. S. A.

distributed by

S. BLICKMAN, INC.

Manufacturers of Food Service Equipment for Schools and Institutions

3400 Gregory Ave.
Weehawken, N. J.

A 3-Way Service FOR MASS FEEDING INSTALLATIONS

1 ENGINEERING and LAYOUT: On approved contracts, our service includes related planning, manufacture and installation of complete units. Our engineers evaluate the specific requirements of your mass feeding problem and arrange space and equipment for most effective use of manpower.

2 DESIGN and FABRICATION of INDIVIDUAL UNITS: Blickman engineers carefully design each item to carry out its function efficiently. Our equipment is noted for its welded, crevice-free construction. It is easy to clean, durable and attractive in appearance.

3 THE "KNOW-HOW" IN BUILDING FINE FOOD SERVICE EQUIPMENT: For nearly three-quarters of a century, S. Blickman, Inc. has specialized in the planning and manufacture of food service installations for every need. Our factory is one of the largest in the industry.

your mass feeding installation can serve well for decades!

Whether your new food service equipment will give trouble-free performance for just a few years – *or twenty and more* – depends on how *well* it has been built. You *can* be sure of long years of low-cost maintenance – you *can* cut labor costs—if you select a Blickman-Built installation. Blickman equipment is a sound investment because it is soundly built to assure long service life. Prominent educational institutions throughout the country can attest to this fact. Compare before you buy!

Send for illustrated folder
"Blickman-Built Food Service Equipment"

Blickman-Built
FOOD SERVICE EQUIPMENT

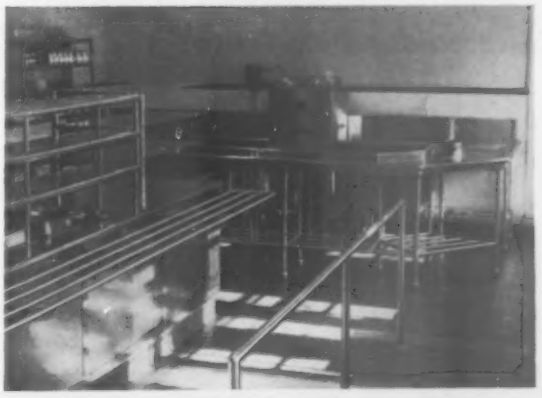


STATLER HALL, CORNELL UNIVERSITY, *Ithaca, N. Y.* — Section of main kitchen, showing stainless steel equipment in pantry. This prominent educational institution emphasizes the scientific approach to hotel and restaurant management. Modern Blickman-Built units were chosen for their sanitary and durable qualities.



UNIVERSITY OF WYOMING
Laramie, Wyo.

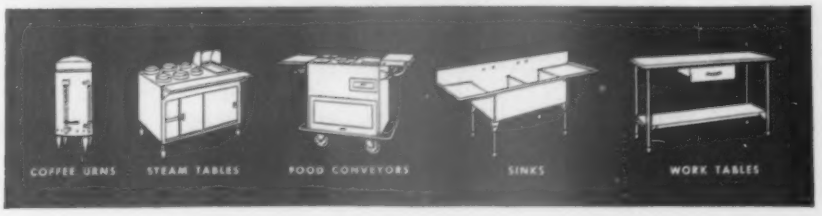
View of all-stainless steel cafeteria counter. This modern university chose stainless steel equipment for both cafeteria and kitchen as best for student feeding and long-range economy. The installation won a "Grand Award" in a recent Institutions Magazine food service contest.*



PHILLIPS-EXETER ACADEMY
Exeter, New Hampshire

Section of stainless steel cafeteria counter at left; stainless steel dish tables in background. This renowned New England school seeks every modern facility for its students. Installations in Dunbar and Webster Halls were selected for long service life and perfect sanitation.

*Blickman-Built installations have won 25 awards in 7 years in the annual Institutions Magazine contests.



THE ALUMINUM COOKING UTENSIL COMPANY

6253 Wear-Ever Bldg., New Kensington, Pa.

WEAR·EVER Aluminum Gas-Fired Kettle



Cooks without steam!

The ideal method for quantity food preparation when steam is unavailable. Gas heat is applied directly to a heavy gauge, seamless aluminum shell. Spreads heat so fast and evenly that the entire utensil does the cooking. Sanitary protection and emptying ease are provided by easy-to-clean valve and tangent draw-off. Kettle is equipped with automatic pilot.

Features a specially designed Blodgett Pyrastove burner. Non-cast iron construction reduces weight, eliminates breakage. Fuel is saved by sensitive low temperature control.

Also features a non-drip, single piece aluminum cover, which closes down over the kettle bead. Has cool drop handle.



Pyrastove Burner



Non-Drip Cover

Specifications for Wear-Ever Gas-Fired Kettles

	No. 19020 20 gal.	No. 19030 30 gal.	No. 19040 40 gal.
Overall Height	37	37	37
Outside Diam. of Casing	27	31 1/16	33 3/8
Size of Draw-off	1½	1½	1½
Floor to Draw-off	19 13/16	18 5/16	15 13/16
Gas Inlet I.P.S.	¾	¾	¾
Height of legs	6	6	6

STOCK POTS



Two styles, regular and with bibbs (faucets) and strainers. Loop handles, open beads. In 2¼, 3, 4, 5, 6, 7½, 10, 15 and 20 gallon sizes.

Also: Extra heavy duty style in 13 sizes.

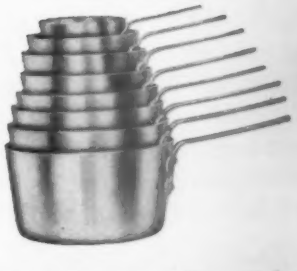
SAUCE POTS



Have open, sanitary beads, loop handles, rounded corners and flat bottoms. Available in 14, 20 and 26 gallon sizes.

Also: Extra heavy duty style in 8 sizes.

SAUCE PANS



Sloping sides, rounded corners, long handles. Nesting sizes as follows: 1⅞, 2¾, 3¾, 4½, 5½, 7, 8½ and 10 quart sizes.

Also: Extra heavy duty style in 9 sizes.

WEAR-EVER ALUMINUM TRADE MARK REG. U.S. PAT. OFF.

SEND FOR A COPY OF WEAR-EVER'S CATALOG SHOWING THE COMPLETE LINE

THE ALUMINUM COOKING UTENSIL COMPANY

DOUBLE BOILERS



With flat-bottom inside container. Available in 8¾, 11 and 17½ quart sizes.



With flat-bottom inside container. Available in 5½ quart size only.



With round-bottom inside container that will stand by itself. In 8, 12 and 20 quart sizes.

"OVEN FIT" ROAST AND BAKE PANS



"TWIN" OVEN UNITS fit side-by-side without loss of space. The three pans in this group allow any combination of covered or open roasting. Tops are interchangeable to provide desired pan heights. Pans are 2¼"-3½"-6½" in depth.



FULL OVEN-SIZE PANS in four sizes provide proper dimension for any roasting or baking need. The 1¼", 2¼" and 3½" depth pans serve as separate bake or sheet pans or as covers for deep roast pan.

UTILITY PAN



Ideal for holding table silver, or for use as a refrigerator pan. Has stain-resistant Alumilite finish; open sanitary bead. Available with "slide-on" cover.

SHEET PANS



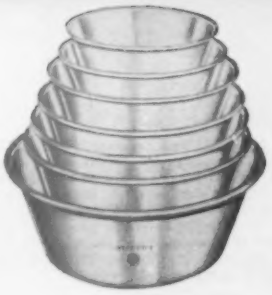
Rolls and sweet goods baked on these pans have an even texture and color. That's because aluminum absorbs and spreads heat evenly. The superb baking surface is unaffected by moisture or washing. Strong, light. Many sizes in choice of Alumilite or natural finish. See catalog or your dealer for details.

PIE PANS



Absorb and spread heat evenly; produce a golden-brown crust. In Alumilite or natural finish. Top inside diameter 9". Also other styles and sizes.

KITCHEN PANS



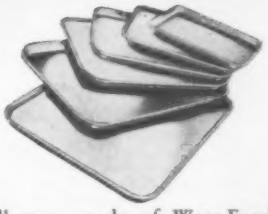
Available in seven nesting sizes as follows: 1½, 2, 3, 4, 5, 6 and 10 quart sizes.

PITCHERS



Light yet strong and dent-resistant. Have cool Bakelite handles as shown, or welded aluminum handles. In 1½, 2⅛ and 3¼ quart sizes. Also other sizes and styles.

TRAYS



All trays made of Wear-Ever's extra hard aluminum alloy. Your choice of regular or Alumilite finish. Six sizes from 12½" x 9⅜" to 22½" x 16 9/16". See catalog or your dealer for details.

PROFESSIONAL CUTLERY



These six knives are commonly used in school kitchens: 2½" cook's paring knife; 3" clip-point paring knife; 6" fruit and salad knife; 8" French cook's knife; 8" clip-point butcher knife; 10" slicer. Made of high-carbon alloy steel specially developed for Wear-Ever cutlery. (On fruit knife and paring knives a special edge-holding, high-carbon stainless steel is used.) Also a complete line of professional cutlery with the new safety-grip Lamb Wedgelock handle.

Send for complete Professional Cutlery Catalog.

NOW AVAILABLE... Check sheets giving recommended lists of utensils and other equipment for different size cafeterias. Tell us how many you feed and we'll send you the list you need.

THE CLEVELAND RANGE CO.

3333 Lakeside Ave., Cleveland 14, Ohio

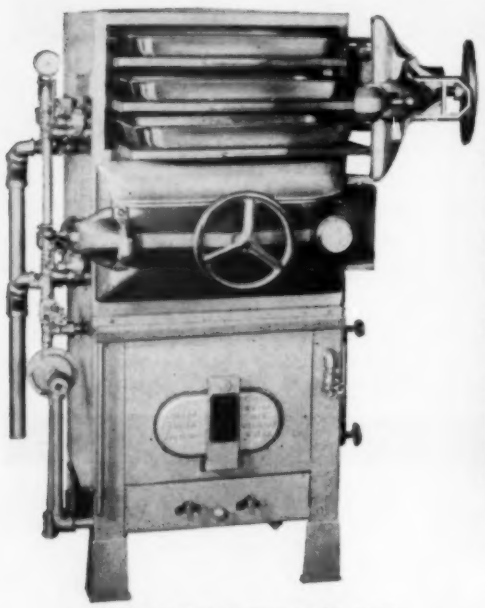
STEAM-CHEF and STEAMCRAFT COOKERS

for all School, College and Institution Kitchens

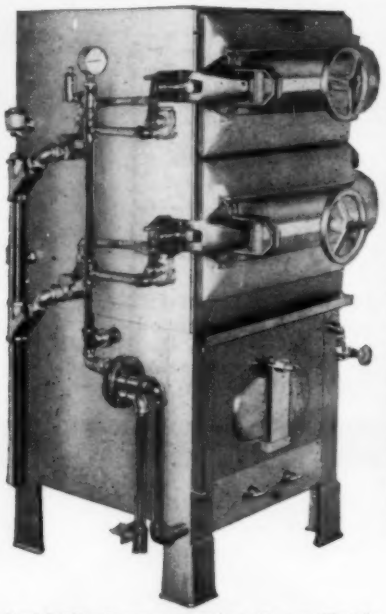
Cleveland Range has long held a position of leadership in steam cooking equipment. Ours is the most complete line, including large capacity Steam-Chefs, and a choice of models in Steamcraft cookers for smaller kitchens.

Thousands of Steam-Chefs and Steamcrafts are in service today, each providing a contribution to higher utility, economy, finer cooking, cleanliness and safety.

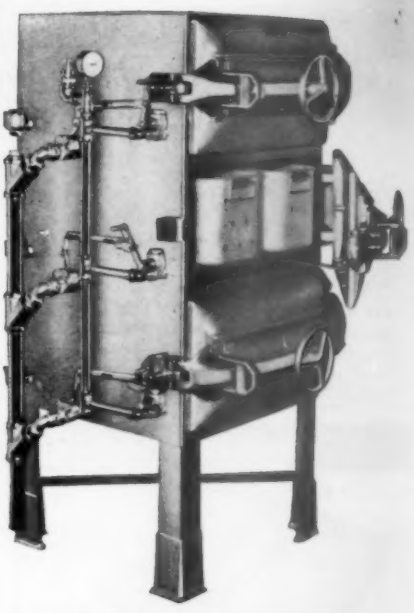
DIRECT STEAM-GAS-ELECTRIC OPERATION



Cafeteria Pan Steamer Model 20-3B Upper compartment steams food in standard cafeteria pans for direct placement on serving tables without transfer of food. Built to accommodate 6 standard 12" x 20" or 12 half size cafeteria pans, this STEAM-CHEF also accommodates steaming baskets in lower compartments, also available in 3 or 4 compartment models.



Model 25B, Steam generating, Gas or Electric, 2 compartment. Also available in direct-connected type. Capacity 4 bushels. For kitchens serving up to approximately 500 persons.



Model 101-3B, Direct-connected typical 3 compartment style. The most popular size for average requirements. Capacity 6 bushels. For kitchens serving up to approximately 800 persons.

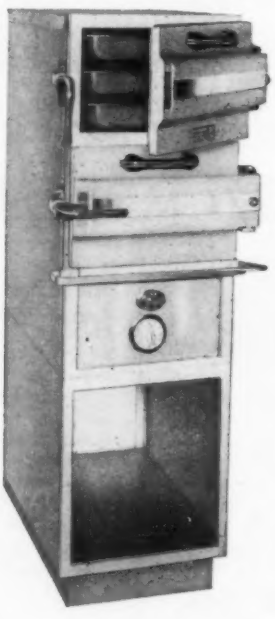
Steamcraft

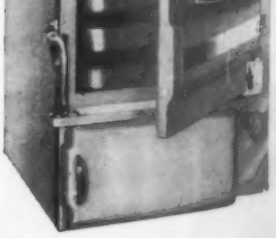
or STEAM-CHEF

thousands in use everywhere
. . . write for list of

SCHOOL AND COLLEGE INSTALLATIONS

Steam-Chef and Steamcraft are sold through kitchen equipment dealers. Complete illustrated literature giving details and specifications is available on request—write to: The Cleveland Range Company, 3333 Lakeside Avenue, Cleveland 14, Ohio.





STEAMCRAFT COOKER AND WARMER

for smaller kitchens—direct steam, gas or electrically operated. Ideal for serving up to approximately 200 persons. Excellent for diet kitchens. Shown is a 2 compartment Steamcraft on floor base. Holds six regular 12" x 20" pans. To the right is a 1 compartment Steamcraft "Cub" counter model. Occupies only 22" space, holds 3 cafeteria pans. Base optional. Ask for Steamcraft folder.

NUTTING TRUCK AND CASTER COMPANY

1230 Division Street, Faribault, Minn.

Nutting QDC* TRUCKS

SOLVE ALL YOUR HANDLING PROBLEMS

A complete line of more than 1000 different truck models are available from Nutting. This varied line gives you an almost unlimited opportunity in selecting the right trucks for the handling problem that faces you. Because of this unusually large selection and Nutting's exclusive QDC factor, you get a satisfactory solution to your problem on a low cost-per-year basis.

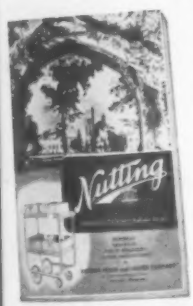
***Quality Design and Construction** is the result of 64 years experience . . . your assurance of correct, up-to-date designs . . . maintenance-free long life . . . easy operation. Each QDC Truck is designed to do a specific job with top efficiency and minimum manpower.

Engineering services provided by Nutting can be used to solve your extra-difficult problems. Engineering's recommendations for a problem usually require only minor modifications of one of Nutting's 1000 standard trucks . . . custom design is cut to a minimum.

Local representatives of Nutting will help you solve your handling problems . . . call your Nutting representative, he's listed under "Trucks" or "Casters" in the yellow pages.

Know and use the complete Nutting facilities . . . the complete QDC line . . . engineering service . . . nationwide sales organization.

Write for free Bulletin 53-SC: It's fully illustrated and gives complete specifications on 39 different trucks especially designed for schools and institutions to handle:



Books	Baggage
Trays	Wrestling Mats
Pianos	Folding Chairs
Dishes	Cleaning Supplies
Linens	Laboratory Equipment

Kitchen and Bakery Materials and Utensils

Since 1891 **NUTTING TRUCK AND CASTER COMPANY**

1230 Division Street, Faribault, Minn.



Figure 965.
For Folding Chairs—chairs stack flat and crosswise. Only 27¼" overall height for understage storage. Eight standard sizes.



Figure 967-SR.
For Folding Chairs—holds one vertical row of chairs. Self-locking, yet free sliding end rack for secure, partial loads. Six standard sizes.



Figure 961.
For Rectangular Tables with Folding Legs. Low, 7½" platform height for easy loading.



Figure 963. For Wrestling Mats. Provides transportation and mobile storage. Keeps mats clean and in original shape.

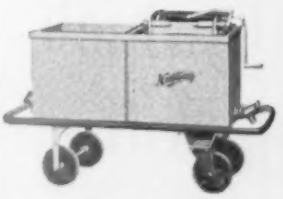


Figure 936-LB. For Mopping. Eliminates bucket carrying. Removable wringer fits either of the two compartments. Two sizes—26 or 52 gallon capacity.



Figure 939. Transports Janitors' equipment and supplies.

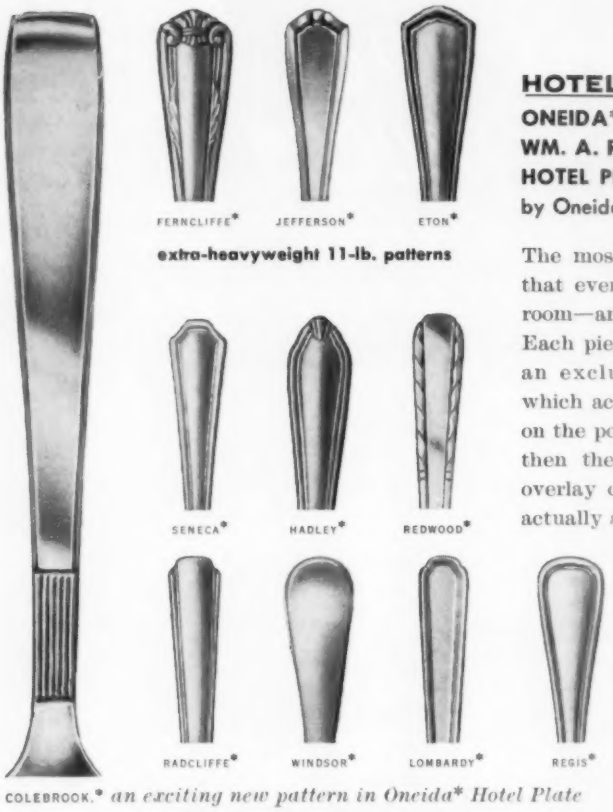


Figure 1912-ST. For Dishes. Full stainless steel construction. Available in a variety of styles and sizes.

ONEIDA LTD.

Oneida, N. Y.

which will serve you best?



HOTEL PLATE

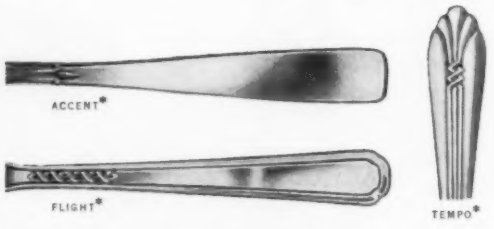
ONEIDA* HOTEL PLATE
WM. A. ROGERS* HOTEL PLATE
by Oneida Ltd. Silversmiths

extra-heavyweight 11-lb. patterns

The most luxurious silverplate that ever graced a hotel dining room—and the longest-wearing. Each piece is "balance-plated," an exclusive Oneida process which actually puts more silver on the points of greatest wear—then they are reinforced with overlay of *pure* silver. You can actually *see* it on the silverplate!

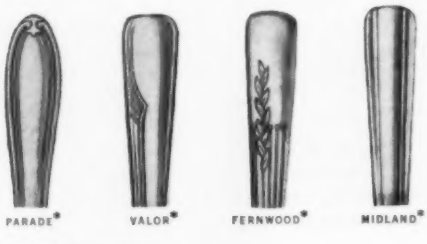
an exciting new pattern in Oneida Hotel Plate*

smart, heavyweight 9-lb. patterns



ONEIDACRAFT* De Luxe Stainless

Competitive with the finest, but moderately priced



ONEIDA* STAINLESS

Quality that's economy-priced

STAINLESS STEEL
made with silversmith skill

ONEIDACRAFT* De Luxe Stainless
ONEIDA* STAINLESS

Made of the highest-quality stainless. Only Oneida's expert craftsmen can mold such fine, smooth edges, detail such delicate patterns, buff a finish so mirror-bright it will stay that way, without polishing, for life!

For complete information write to: **ONEIDA LTD.**
Silversmiths, Oneida, N. Y.



*TRADEMARKS OF ONEIDA LTD., ONEIDA, N. Y.

PUFFER-HUBBARD REFRIGERATOR COMPANY

Grand Haven, Michigan

Export Office • **PUFFER-HUBBARD INTERNATIONAL** • **440 Lafayette St., New York City** • **Cable "MANREFSUP"**



PASS-THRU CABINETS

Designed for installation in the wall between dining room and kitchen with access from either room. Ideal for storage of salads and other prepared foods. Available in 3 models: 6, 9, and 12 doors with 50, 75, and 105 cu. ft. capacities.



DRY BEVERAGE COOLERS

7 MODELS — REMOTE & SELF-CONTAINED

PUFFER-HUBBARD *Lifetime* REFRIGERATORS

IN PORCELAIN ENAMEL OR STAINLESS STEEL FINISH

Year after year, more and more Schools, Universities and other Institutions are turning to America's finest quality commercial refrigerators . . . the Puffer-Hubbard Line. The reason for this swing to "P-H" equipment is that for efficiency, lowest operating and maintenance cost, and long life service, it pays to buy the Very Best! Whatever your food service refrigeration requirements may be, it will be well worth your while to investigate these famous "P-H" *Lifetime* Features! Genuine Porcelain or Stainless Steel Finish . . . Patented "Grad-U-Matic" Air Conditioning . . . Sag-Proof Door Construction . . . Tubular Electric-Welded Steel Frames . . . Heavy Fiberglass Insulation . . . Solid or Triple Thermopane Doors . . . Automatic Self-Defrosting Freezing System . . . Underwriters Approved.



REACH-IN CABINETS

Available in models 20 to 90 cu. ft. capacities . . . 2 to 8 doors . . . self-contained or remote . . . choice of Porcelain Enamel or Stainless Steel finish.

The Complete "P-H" Line also includes Walk-in Coolers and Freezers, Dough Retarders, Baker's Freezers and Dairy-Delicatessen Cases.



UPRIGHT STORAGE FREEZERS

Available in 3 models . . . 40, 59 and 87 cu. ft. capacities . . . 4, 6, and 8 doors . . . choice of adjustable shelves or tray racks.

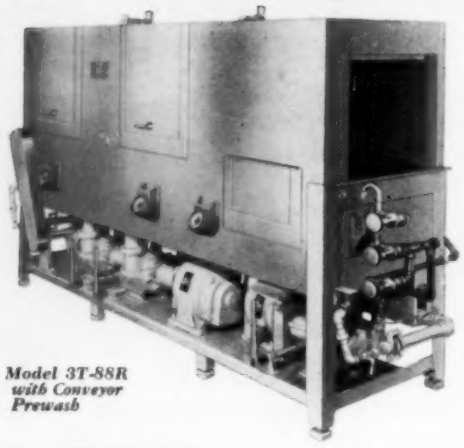
THE MARK OF A GOOD CASE — THE P·H LINE — ESTABLISHED 1898

See YOUR NEAREST "P-H" DEALER, OR ***Write*** **TODAY** FOR ILLUSTRATED LITERATURE!

TOLEDO SCALE COMPANY

Toledo 1, Ohio

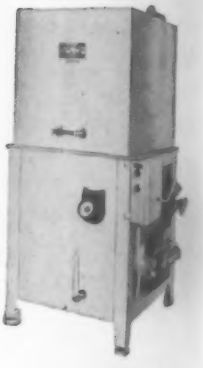
Save Time...Control Costs with TOLEDO®



Model 3T-88R with Conveyor Prewash

√ DISHWASHERS

Performance-proved Toledo Dishwashers, both door-type and automatic conveyor machines. Wide choice of sizes and capacities ranging from single tank manual door models handling 850 dishes per hour . . . up to heavy-duty three-tank machines capable of averaging 11,400 dishes per hour. Also available—new Combination Dishwashers with conveyor pre-wash—combining pre-wash, wash and rinse in a single automatic-conveyor machine.



Model DS-27 Door Type

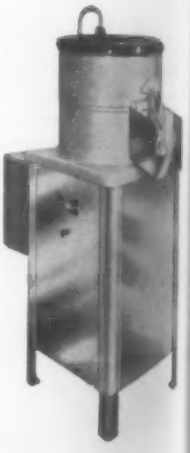


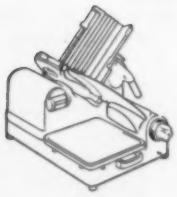
√ DISPOSERS

Toledo Disposers help you cut kitchen costs by fast, easy, sanitary disposal of food waste. "Reverso-CLEAN" action. Shreds food wastes, flushing these down the drain; fast, continuous feed. Motor reverses each time switch is turned on or when under extra load. Easily installed in standard opening, or may be equipped with cone, scrapping block, and silver guard.

√ PEELERS

Your choice — 10 models! Toledo Double Action Peelers are speedy, efficient . . . with peeling achieved by sharp abrasive on both disc and cylinder. Uniform "skin deep" peeling with minimum of waste. Built-in peel trap empties direct to waste can. Easy to clean and keep clean. Full rated capacity is peeled in 1 to 1¼ minutes.

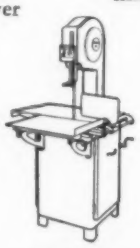




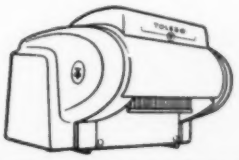
√ SLICERS



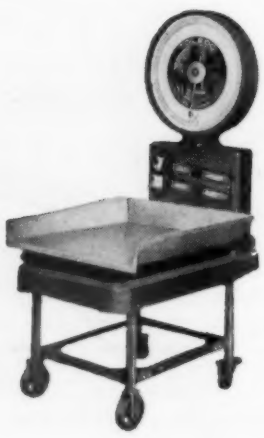
√ CHOPPERS



√ SAWS



√ STEAK MACHINES



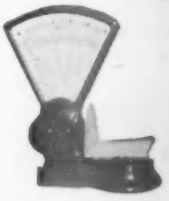
√ RECEIVING SCALES

Model 2181 Portable Scale with Adjustable Wheeled Stand and Packing House Pan. Excellent for weighing in meats, produce and other food items. Other Toledos include floor scales, overhead track scales, automatic laboratory scales . . . a complete selection all the way up to motor truck scales.



√ PORTION SCALES

Toledo Speedweigh Model 3011 Over-Under Scale for weighing portions and ingredients in kitchens and other uses. Provides new speed with high accuracy . . . sensitive to 1/64 of an ounce. Shadow-free, wide-angle reading.



√ MAILING and PARCEL POST SCALES . . .

Model 419 to 3 lb. Easy to read . . . accurate computing. Parcel post models to 70 lb.

THE TRIUMPH MFG. CO.

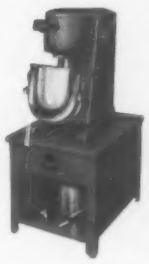
3400 Spring Grove Avenue
Cincinnati 25, Ohio

TRIUMPH FOOD MIXERS

Sanitary in Design . . .
Efficient in Operation . . .



The new, portable type "N" 12 quart Bench Mixer, shown on storage type cabinet stand, features Variable Speed, Single Lever Control, Power-Take-Off on side.



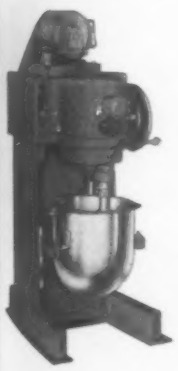
The type "N" 20 quart Bench Mixer shown on storage type cabinet stand. Features Variable Speed, Single Lever Control, Power-Take-Off on side.



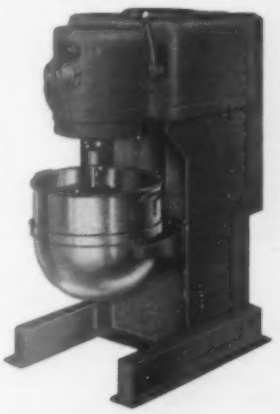
The new, floor model type "N" 12 quart Mixer, features Variable Speed, Single Lever Control, Power-Take-Off on side.



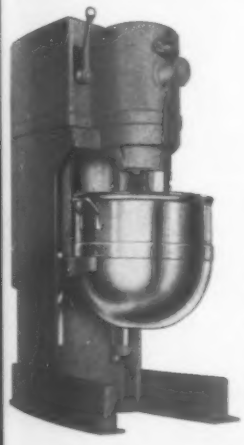
The new, floor model type "N" 20 quart Mixer, features Variable Speed, Single Lever Control and Power-Take-Off on side.



Type "LI" 60 Quart Mixer is a medium sized mixer at a popular price. It readily meets all requirements of speed, production and versatility. The "LI" 60 features syncromesh transmission with all gears running in a bath of oil. Gear teeth are in constant mesh actuated by positive clutches. Speed can be changed at will by One Hand Control Lever without fear of damaging gear teeth through improper manipulation.



Type "M" 30 Quart Mixer is a small type floor model mixer that meets all requirements for speed, production and versatility. The three speed selective transmission is operated by One Hand Control Lever.



Type "KI" 80 Quart Heavy Duty Mixer is a rugged four speed mixer that will help you increase your production while cutting your production cost. One Hand Control Lever allows quick changing of speeds while the machine is running. Syncromesh transmission with all gears running in an oil bath prevents gear teeth damage through improper manipulation.



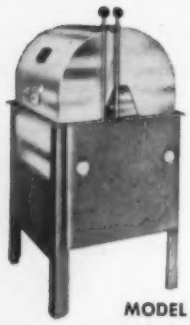
Type "LI" 80 Quart Mixer is a sturdy, well balanced, three speed machine, remarkably free from vibration. The "LI" 80 is designed to give years of efficient service with extremely low maintenance cost. It also features syncromesh transmission and the 3 speeds that can be changed by One Hand Control Lever while the machine is in operation.

UNIVERSAL DISHWASHING MACHINERY CO.

45 Windsor Place, Nutley 10, New Jersey

Only *Universal* offers all these great dishwashing improvements

Your Choice of 31 Quality Models of *advanced design* for every dishwashing need



MODEL D

One tank, straight through, roll top. Floor space 24" x 24". 1,250 dishes per hour. Motor ½ h.p. with two power wash. Wash tank capacity 15 gal.; pump capacity 100 gal. Four 20" x 20" racks.

Your choice of SWING-WASH
- STATIONARY WASH
- REVOLVING WASH

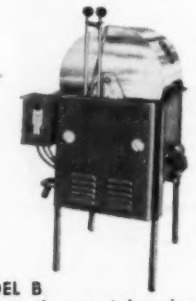
You get the *BEST* water pattern for your washing job.



MODEL HD

One tank, straight through (doors). Floor space 26" x 24". 1,250 dishes per hour. Motor ¾ h.p. Wash tank capacity 15 gal.; pump capacity 140 gal. Four 18" x 18" racks. Also available as Model HDC for corner operation.

Your choice of electric, gas or steam operated **BOOSTERS** can be built right into Universal Dishwashing Machines. Meets Health Department requirements. Requires no extra plumbing. Saves installation cost.



MODEL B

One tank, straight through, standard height roll top. Floor space 20" x 20". 625 dishes per hour. Motor ⅓ h.p. Equipped with electric timed wash and rinse control. Special high hoods available for 10½" plates.

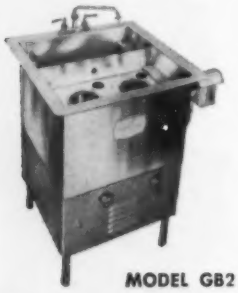
For 180° Rinse



MODEL M

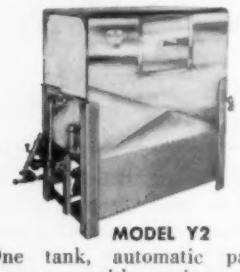
combines ELECTRIC-TIMED WASH AND RINSE CONTROL, 180° GAS FIRED RINSE WATER BOOSTER AND SWING WASH IN ONE UNIT.

One tank, straight through (doors). Floor space 28" x 36". 2,000 dishes per hour. Motor 1 h.p. Wash tank capacity 25 gal.; pump capacity 100 gal. Five 20" x 20" racks. Also available as Model E for corner operation.



MODEL GB2

Double brush glass scrub unit to mount in dishtable ahead of dishwasher. Capacity 2,000 glasses per hour.



MODEL Y2

One tank, automatic pawl conveyor with swing-wash. Floor space 28" x 46½". 3,750 dishes per hour. Two motors control a separate wash and rinse action. Wash tank capacity 38 gal.; pump capacity 250 gal. Seven 20" x 20" racks.



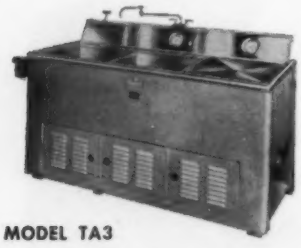
MODEL MM3

Two tanks, automatic pawl conveyor (curtains). Floor space 28" x 70½". 5,000 dishes per hour. Two 1 h.p. motors for separate power wash and rinse. ⅓ h.p. motor controls conveyor and final rinse. All motors vee belt connected.



MODEL S

One tank, straight through or corner, three doors. Floor space 30" x 29½". 1 h.p. motor. All doors interlock with single lever control. Revolving wash and rinse action. Five 20" x 20" racks.



MODEL TA3

Three tank immersion dishwasher. First tank, pre-scrap; second tank, power wash and third tank final immersion rinse, with additional foot lever operated fresh water spray. Floor space 67" x 25". Capacity 3,500 pieces (80 baskets) per hour.

Write for complete catalogue Today

Universal DISHWASHING MACHINERY CO.

COMMERCIAL TYPE UNIVERSAL DISHWASHERS

45 Windsor Place, Nutley 10, N. J.

WORLD'S LARGEST Exclusive PRODUCER OF COMMERCIAL TYPE DISH, GLASS AND SILVER WASHING MACHINES

The most important equipment for the heart of the dishwashing system

UNIVERSAL INDUSTRIES

374 Mystic Ave., Somerville 45, Mass.

Univex vegetable peelers • food mixers • machine stands



Portable Vegetable Peeler — Model "G"

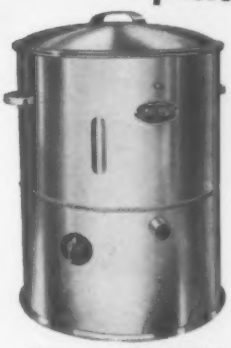
Peels Full Load in ONE MINUTE. SAVES up to $3.00 per 100 lbs. over hand peeling COMPLETE

$149.95

Do More—Cost Less!

Capacity 20 lbs.; Height 21¾; Delivery Chute 4; Diameter 15

- NEW SNAP-ON COVER WITH HINGED OPENING Completely Eliminates All Splattering and Splashing
- NEW ELECTRIC SYNCHRONIZED TIMER
- NEW LIFE-LONG BEARING ASSEMBLY Eliminates Lubricating
- NEW EXTENDED DISCHARGE CHUTE
- NEW POSITIVE PRESSURE LOCK DOOR WITH QUICK SNAP-ACTION OPENING
- NEW AIR-GAP TYPE WATER INLET



Economy Portable Model E-C

- Peeling Capacity 20 lbs.
- Automatic Timer
- Manual Delivery

$114.95

Stainless Steel Peel Trap Base

The Univex Peel Trap Base, Model P300, is an accessory which converts any portable Univex Peeler into a floor model for permanent installation. Packed separately, the base can be attached, at the point of installation, to discharge in any direction.

SPECIFICATIONS

CONSTRUCTION: Heavy stainless steel. Satin Finish. Top of base is sealed to prevent moisture from entering motor compartment.

ADJUSTABLE LEGS: Heavy stainless steel construction. 4" adjustment possible for sink discharge.

PEEL TRAP: Slide-in perforated stainless steel drawer.

WATER INLET AND DRAIN: Water inlet tubing mounted to Peel Trap Base. Standard ½" pipe thread. Standard 2" drain connection located on bottom of cabinet.

WEIGHT: Net weight 38 lbs. Shipping weight 45 lbs.



$79.95

UNIVEX UTILITY STANDS

*Available in Gray Hammertone Finish or in Stainless Steel. These Utility Stands are shipped knocked-down and have multiple uses . . . In addition to being ideally suited for Peelers, Mixers and Slicers, these Utility Stands can be made up to meet requirements for other functions and sizes by the addition of varying combination parts. HERE ARE A FEW COMBINATIONS MADE UP FROM BASIC SIZE MODELS:



M-100
Mobile Stand
Steel — $53.50
20" x 20"
HT. ADJ. 24" to 36"



E-240
Machine Stand For Mixer
Steel — $50.00
24" x 24"
HT. ADJ. 24" to 36"



24" x 48"
HT. ADJ. 36"
B-480
Wood Top Work Table with Drawer
Steel Base- $93.00



24" x 48"
HT. ADJ. 36"
C-480
Grille & Fry Stand
Steel — $56.00



MODERN NEW MODEL 1222 PORTABLE 22 QT. UNIVEX FOOD MIXER

- FIRST WITH AUTOMATIC TIMER
- EASY LOADING . . . Elevating and Swing Bowl Action
- VARIABLE SPEEDS . . . No Shifting — no stopping to change Speeds
- AT A PRICE LOWER THAN THE REST

SPECIFICATIONS: Width 17¾"; Height 26"; Depth 29"; Weight 235 lbs. (Shipping Wt. 275 lbs.) Heavy welded steel construction - Soft hammertone lacquer finish. Capacitor start ⅓ HP motor, 115 volts, 60 cycles - V-Belt Drive with variable pitch sheaves transmitting positive power and speeds to transmission head.

Speeds: Beater - 105 to 360 RPM. Attachments - 79 to 275 RPM. 12 Quart Bowl fits without Ring or special attachment. Grey Hammertone Finish

includes Mixer Unit complete with 22 Qt. Bowl, Batter Beater, Wire Beater — ready to plug in

$339.50

Precision manufactured to provide the smoothest mixing possible and greater versatility with a specially designed power Take-off for meat choppers, slicers, etc. - adaptable for use with other makes of attachment.

MIXER STAND
(Optional)

MODEL A240

24" sq. top and shelf adjustable legs 24" - 36"

STANDARD BEATERS: Wire Beater - Batter Beater - 4-wing Wire Beater - Pastry Knife Dough Hook.

Prices Slightly Higher in the West

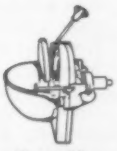


$35.00

ATTACHMENTS and ACCESSORIES



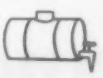
Meat & Food Chopper
$42.00



Vegetable Slicer
$78.00



Knife & Tool Sharpener
$59.00



1 - gal. Oil Dripper
$19.00



Mixer Bowl
22 qt. - $22.00
18 qt. - $18.00



Bowl Extension Ring
22 qt. - $14.00
12 qt. - $13.00

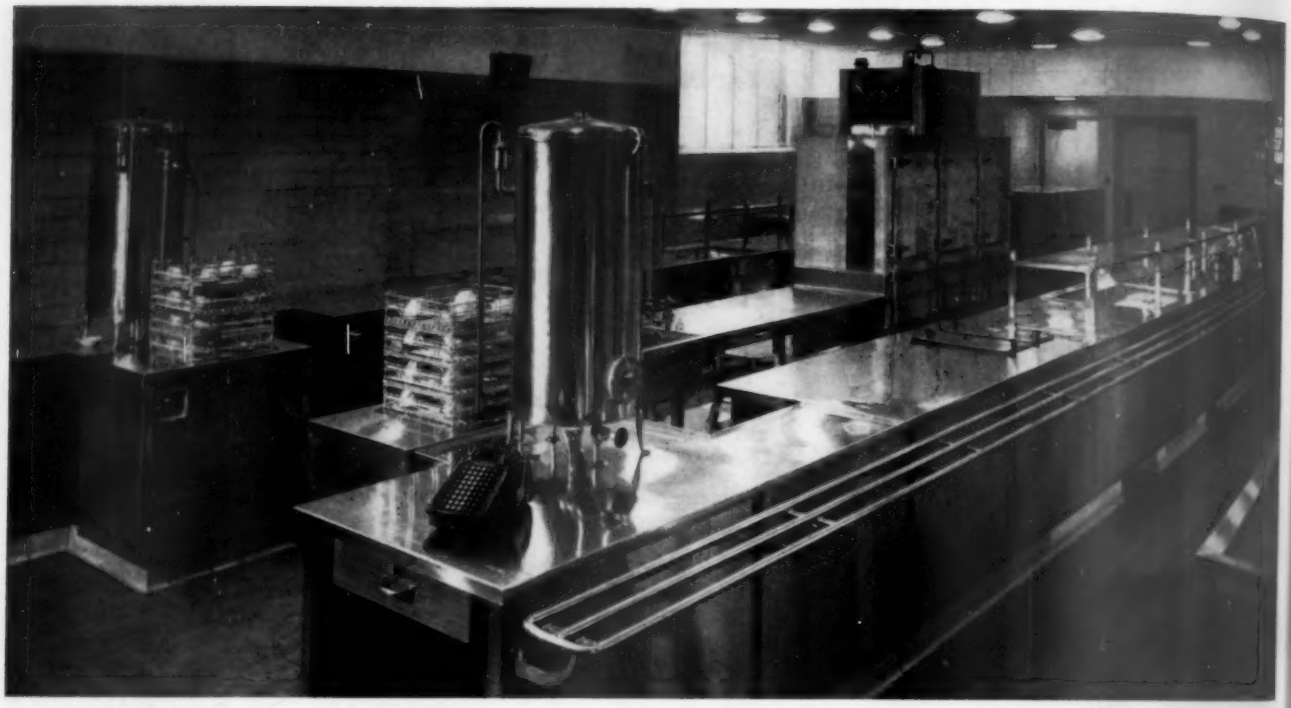


Bowl Splash Cover
22 qt. - $10.00
12 qt. - $9.00

THE JOHN VAN RANGE CO.

Branches in Principal Cities

535-555 Culvert Street, Cincinnati 2, Ohio



Cafeteria • High School • Birmingham, Michigan Swanson Associates • Architects Food Service Consultants • J. E. Stephens Associates

food service equipment leaders since 1847

● Ever since its establishment in 1847 The John Van Range Company has specialized in designing and fabricating food service equipment for public and private schools and colleges.

● The first portable steel range in the world was the invention of the founder of this company. Carrying on, his successors have pioneered in developing new and improved equipment, spearheading advances in the science of mass feeding.

● When you see an unusually fine food service installation, you will undoubtedly find Van's name plate on the equipment.

● **If you are planning food service equipment improvements, make use of *Van's century of experience.*** Write today for new Van book showing illustrations of installations in all types of institutions.

REPRESENTATIVE VAN INSTALLATIONS

Pennsylvania State University	University Park, Pennsylvania
West Point Military Academy	West Point, New York
Purdue University	Lafayette, Indiana
University of Cincinnati	Cincinnati, Ohio
Hanover College	Hanover, Indiana
Holmes High School	Covington, Kentucky
St. Joseph College	Rensselaer, Indiana
Hebrew Union College	Cincinnati, Ohio
Boston Public Schools	Boston, Massachusetts
De Pauw University	Greencastle, Indiana
North Carolina State College	Raleigh, North Carolina
Holy Cross College	Worcester, Massachusetts
Michigan State College	Lansing, Michigan
University of Oklahoma	Norman, Oklahoma
Sweet Briar College	Sweet Briar, Virginia
University of Kentucky	Lexington, Kentucky
University of Texas	Austin, Texas
Instituto de la Ciudad University	Caracas, Venezuela
Marshall College	Huntington, West Virginia
Oklahoma A & M College	Stillwater, Oklahoma
Jefferson School	Hamilton, Ohio
High School, U. S. Atomic Energy Com.	Oak Ridge, Tennessee
Ohio State University	Columbus, Ohio
Providence College	Providence, Rhode Island
Wittenberg College	Springfield, Ohio
University of West Virginia	Morgantown, West Virginia
Hiram College	Hiram, Ohio
University of South Carolina	Columbia, South Carolina
University of Tennessee	Knoxville, Tennessee
Miami University	Oxford, Ohio
Xavier University	Cincinnati, Ohio

The John Van Range Co.

EQUIPMENT FOR THE PREPARATION AND SERVING OF FOOD

Planning your classroom kitchens for maximum efficiency with General Electric appliances

In teaching modern homemaking properly, the need for classrooms equipped with modern automatic appliances is particularly important today.

Existing appliances have been improved. New appliances have appeared. New ideas, particularly "built-ins," have begun to take root.

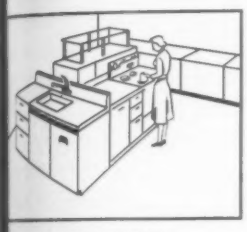
Your classroom kitchens can be equipped with General Electric *matched* appliances—and planned by G-E experts —at a very low cost to you.

Let General Electric plan for you. Your General Electric distributor's kitchen-planning expert can plan a practical arrangement of classroom equipment with an eye to both your needs and budget.

Why not take full advantage of this expert's complete knowledge and experience? His job, from preliminary discussion to finished plans and blueprints, *will not cost you one cent*—and will probably save you money on the complete installation.

The General Electric Consumers Institute. One of the major activities of the G-E Consumers Institute is planning programs and suggesting new methods of demonstration for home economists all over the country. Its staff members visit many home economics classrooms and know the advantages of proper arrangement of equipment.

Here are some planning points which they feel are worth considering:



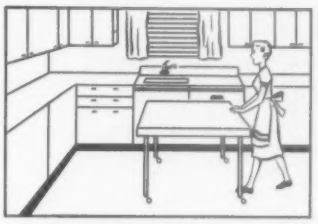
ISLAND UNITS

very efficient arrangements here several units are to be supervised by a single person. ey make good use of floor ace and provide convenient splay and storage areas.



TRAFFIC AISLES

must be planned to allow free movement without interfering with students at work. Regular aisles should be at least 6½ feet wide—with special consideration to entrances and storage areas.



MOVABLE TABLES

can double for classwork and demonstration. They should have Textolite® tops to resist heat and stains, and be 35 inches high. A lock stop on the roller of one leg will secure them in position.

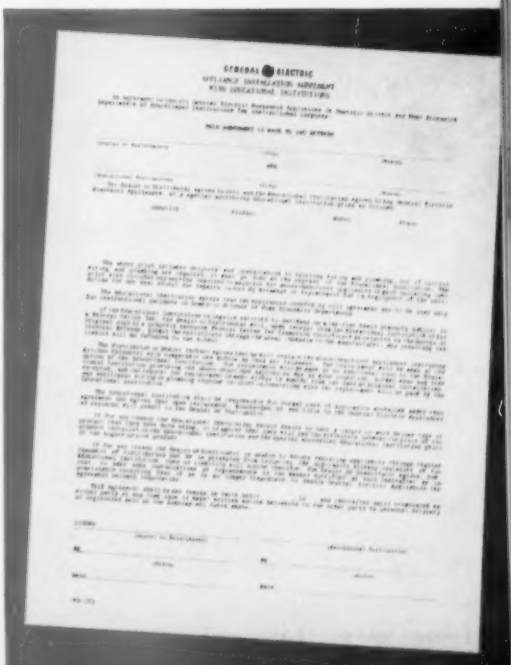


TWO-PERSON UNITS

should be at least 5½ feet in length to avoid crowding—and should be arranged in such a way that the two students do not need to interfere with one another while they are working.

General Electric offers you the finest, most complete line of electrical appliances

On the following pages are shown some of the appliances from General Electric's complete line. Every appliance is manufactured with the same engineering skill and precision that has made General Electric appliances famous over the years. No other manufacturer offers so complete a line of fine appliances.



The General Electric Homemaking Classroom Plan*

Here is a special plan that makes the use of G-E appliances in your classrooms particularly attractive to you.

- **Availability**—Plan is available only to educational institutions for instructional purposes.
- **Special price**—Approximately *one half* recommended retail price.
- **Wiring and plumbing**—If special, the institution bears the expense. However, G-E planning helps keep these costs at a minimum.
- **Tax refund**—Price reduced still further when tax refund is applicable.
- **Always up to date**—New models replace older models *at no cost.*
- **Larger, more de luxe models**—Available for approximately one-half the difference in retail price between installed model and desired model.

*This plan not applicable in state of Texas, where different arrangements exist.

Equip your classrooms with these

EVERY appliance shown on these pages is manufactured according to General Electric standards—among the most rigid and most demanding in the industry.

Every appliance is the product of years of continuing research and constant improvement. That is why we at General Electric say, *"Progress is our most important product."*

Dependability—the keynote which has made General Electric one of the most respected names in American industry.

Preference—More women prefer General Electric appliances—think G.E. makes the best appliances—over any other brand.

Matched appliances—Every G-E appliance is designed for individual beauty, and to blend into a harmonious, matched ensemble.

Complete line—General Electric provides the most complete line of kitchen-laundry equipment. *You place only one order—deal with only one organization.*



G-E 14-Cubic-foot Refrigerator-Freezer Combination (Model LH-14M)

On top is a big, automatic-defrost refrigerator with G-E Revolving Shelves that put all foods at your fingertips. Adjustable, removable door shelves; automatic Butter Conditioner; two roomy vegetable drawers.

On bottom is a true, zero-degree food freezer that holds up to 130 pounds of frozen foods. Handy door shelves, convenient sliding baskets. Freezer door has foot pedal release for easy opening.



G-E 11-Cubic-foot Space Maker Refrigerator (Model LB-11M)

The refrigerator that gives you giant capacity at low cost. Famous G-E Revolving Shelves put all foods at your fingertips, adjust easily up or down *without removing food from the shelves.*

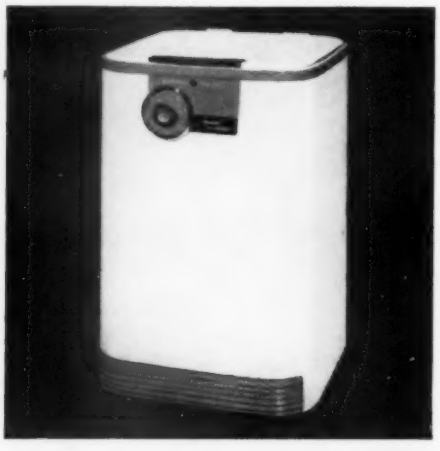
G-E Revolving Shelves are super-strong—give you at least 15% more shelf area than previous corresponding models with old-style shelves. Adjustable, removable door shelves . . . butter compartment in door . . . two roomy vegetable drawers.



G-E Spacemaker Range (Model J-245)

Gives you big-range capacity in compact space! Leaves more room for other appliances—more room for extra cabinets—extra room for a larger dining area. Pushbutton controls; Automatic Oven Timer; "Focused Heat" broiler; Calrod units throughout; Hi-Speed Calrod surface units.

Here is de luxe electric cooking—with features found in much more expensive electric ranges—in an economically priced, unusually compact range!



G-E "Mobile-Maid" Automatic Dishwasher

Dishes, glasses, silver, pots and pans are pre-rinsed, washed, rinsed and dried automatically. King-size capacity washes a complete service for a family of eight. *No installation necessary*—Handy "Unicouple" connector snaps onto the hot water faucet of any sink.

Operates on any 115-volt AC outlet. Rubber-tired, ball-bearing casters for roll-around convenience. Roomy adjustable racks; double-duty detergent cup; selective control.



G-E Disposall® (Model FA-4)

The appliance that eliminates garbage handling forever—a wonderful appliance for the homemaking classroom. You simply scrape food wastes down the sink drain.

The Disposall shreds them to tiny particles and washes them away to sewer or septic tank. Equipped with General Electric Safety Twistop control. Can be easily and quickly installed in any kitchen sink. Also available in the new, low-priced budget model, FC-40.

superb General Electric appliances



G-E 15-Cubic-foot Upright Freezer (Model HU-15M)

Holds up to 525 pounds of frozen foods. Handy door shelves, ice cream conditioner and juice can dispenser in door. Two new Easy-Freeze trays that enable you to freeze meats, fruits and vegetables the loose-pack way for economical, individual servings.

Removable roller baskets; deep Stor-Well for storing bulky hams, turkeys, etc. Automatic interior light; Temperature Indicating Light; built-in handle lock with two keys.



G-E 11-Cubic-foot Chest-type Freezer (Model HC-11M)

Holds up to 389 pounds of frozen foods. Thick glass fiber insulation; easy-opening counterbalanced lid; automatic interior light; adjustable temperature control; positive-action latch with lock and two keys.

This budget-priced G-E Freezer is built to give years of efficient, dependable service—is equipped with the same sealed-in refrigerating system that has made General Electric Refrigerators famous all across America.



G-E Liberator De Luxe Automatic Range (Model J-408)

Two big, automatic ovens! G-E Master Oven holds four pies or four cake layers *on a single shelf.* Two-Shelf Companion Oven will hold four pies or cake layers. New automatic Calrod® surface unit actually watches your cooking for you!

Pushbutton controls with Tel-A-Cook Lights; Automatic Oven Timer (for *both* ovens); electric minute timer; famous "Focused Heat" broiler. Automatic oven flood lamps in both ovens. The most convenient electric range ever made!



G-E Automatic Washer with Filter-Flo (Model WA-750M)

The greatest improvement in automatic washers in years! New G-E Filter-Flo Washing System cleans and recleans the wash water to give you cleaner clothes. Wash water is circulated and filtered 5 times during the wash cycle. Removable aluminum filter on the Activator® post removes lint and light particles.

Heavy sand and silt are automatically rinsed from your wash at the bottom of the basket. Big capacity. Water Saver control; Activator Washing Action.



G-E Automatic Dryer-Conditioner (Model DA-623M)

A perfect matching mate to the G-E Automatic Washer. Does more than just dry clothes—it dries and *conditions* them. Clothes come out looking fluffier—feeling softer—smelling fresh and clean!

Pushbutton controls permit selection of proper drying temperatures for different type fabrics. Timer dial allows selection of drying time. Ozone lamp; removable sprinkler that dampens clothes for ironing automatically. Operates on either 230- or 115-volt installation.



G-E Room Air Conditioner (Model R-73M)

Cools, filters and dehumidifies air for cooling comfort. All-Weather models feature two-system heating for extra-cold weather. Custom-line models do not include two-system heating.

All models can be mounted flush or project into room, and are available in blonde or mahogany finish. New G-E High Power Factor (HPF) models use less electricity. General Electric Room Air Conditioners are available in ½, ¾, 1 and 1½ horsepower.

For truly modern homemaking classrooms... General Electric's new built-in appliances



New G-E Unit Kitchen Laundry. Here is a new, self-contained G-E Kitchen Center that takes a minimum of space and cuts installation costs to a minimum. It is pre-plumbed and pre-wired—and accomplishes every kitchen and laundry function *automatically*. It cooks, broils and fries foods; it flushes away food wastes; washes and dries dishes, glasses, utensils; washes, rinses and dries clothes.

It has counter-height controls, stainless steel surface. It can be combined with the new G-E Wall Refrigerator-Freezer. It is designed so that appliances are interchangeable. No other unit available can serve so many functions so well, yet is so compact!



New G-E Wall Refrigerator-Freezer Combination (Model LW-11). Hangs on the wall like a picture! An utterly new and advanced concept of modern living. The refrigerator compartment (two doors) has an 8.7-cubic-foot capacity. The true, zero-degree freezer compartment (one door) has a 2-cubic-foot capacity. Doors are kept shut by G-E lifetime Alnico magnets—no latches necessary.

New G-E Built-in Range (Surface Unit J-551) (Oven J-501). The built-in all-Calrod® Master Oven is a full 21 inches wide, can be installed waist-high. Automatic Oven Timer. The built-in surface unit can be installed in a 36-inch base cabinet—flush with other counter tops. Four Hi-Speed Calrod Surface Units.



New G-E Built-in Washer-Dryer (under-counter models WD-560M and WD-561M). A compact, built-in home laundry center that washes, rinses and dries clothes in one appliance. 30 inches wide; has a full 9-pound capacity. Completely automatic. Install anywhere in the home. Available as a free-standing model, WD-660M.



Want Complete Information

about General Electric's Homemaking Classroom Plan?

If you are considering changes in your present homemaking classroom, or building a *new* one, write to Consumers Institute, General Electric Company, Appliance Park, Louisville 1, Ky.

We will send a representative to discuss the details of the plan as well as actual models, sizes and prices of equipment that might be needed. This representative will also provide a floor plan showing suggested arrangement of equipment to meet your requirements and classroom layout. No obligation, of course.

Progress Is Our Most Important Product

GENERAL ELECTRIC

General Electric Mix-or-Match Colors

MIX-OR-MATCH COLOR CHOICE APPLIANCES

Adds the appeal and decorator possibilities of *color* to the kitchen and laundry. Only General Electric has a complete line of appliances and cabinets in Mix-or-Match colors. Canary Yellow, Turquoise Green, Petal Pink, Cadet Blue Woodtone Brown or White.

Mutschler SCHOOL EQUIPMENT

SALES OFFICES

NORTHEAST
RAY S. SNYDER COMPANY—New York 17, N. Y.; Maine, Vermont, New Hampshire, Conn., Mass., Rhode Island, New Jersey (north)
H. S. BALLOU—Massapequa, L.I., New York; New York City, Long Island
SCHOOL EQUIPMENT, INC.—Syracuse 3, N. Y.; New York State
AMERICAN SEATING CO.—Philadelphia 30, Pa.; Pennsylvania, New Jersey (south) Delaware

SOUTHEAST and SOUTH
SOUTHERN DESK COMPANY—Hickory, N. Carolina; Maryland, West Virginia, Virginia, North Carolina, Tennessee, Mississippi
AMERICAN SEATING CO.—Atlanta 3, Georgia; South Carolina, Georgia, Alabama, Florida
ALL STATE SUPPLY CO.—Little Rock, Arkansas; Arkansas

NORTH CENTRAL
HALDEMAN-LANGFORD CO.—St. Paul 4, Minnesota; Minnesota
V. A. STUMP—Middleton, Wisconsin; Wisconsin
P. O. WILKINS—Dearborn, Michigan; Michigan
J. S. LATTA AND SON—Cedar Falls, Iowa; Iowa
I. P. REBGER COMPANY—Bellwood, Illinois; Illinois
BURNS SALES COMPANY—Indianapolis 8, Indiana; Indiana
KYSER SALES COMPANY—Warren, Ohio; Ohio

CENTRAL
HOOVER BROTHERS—Kansas City 6, Missouri; Nebraska, Kansas, Missouri (western)
CENTRAL SCHOOL SUPPLY CO.—Louisville, Kentucky; Kentucky
LEN A. MAUNE CO.—St. Louis, Mo.; Missouri (eastern)

SOUTHWEST
W. C. HIXSON COMPANY—Dallas 2, Texas; Louisiana, Oklahoma, Texas, New Mexico
PSSW SUPPLY COMPANY—Phoenix, Arizona; Arizona

WEST
AMERICAN SCHOOL SUPPLY CO.—Denver 2, Colo.; Colorado, Wyoming (eastern)
HULL EQUIPMENT COMPANY—Salt Lake City 2; Utah, Nevada, Idaho, Wyoming (western), Montana
AMERICAN SEATING CO.—Los Angeles 3, California; California (southern)
AMERICAN SEATING CO.—San Francisco 24, California; California (northern)

NORTHWEST and OTHERS
MUTSCHLER BROTHERS CO. Nappanee, Indiana; Oregon, Washington, North Dakota, South Dakota, Illinois (southern)
TOM DEWEY & COMPANY—Lanikai, Hawaii; Hawaiian Islands





A modern homemaking department should be more than a hodgepodge of equipment. That's why so many schools and their architects work closely with Mutschler sales engineers. The planning and installation of school homemaking facilities is their specialty. They work as a part of your own staff to develop the most up-to-date of modern school facilities. See the specifications listed herein . . . then see Mutschler.

MUTSCHLER BROTHERS COMPANY
SCHOOL EQUIPMENT DIVISION
NAPPANEE, INDIANA

Mutschler SCHOOL EQUIPMENT

FOR . . . Foods Laboratory
Laundry Area
Clothing Laboratory
Sewing Laboratory
Grooming Area
Home Management Area
Child Care Area
General Storage Areas
Art Room Storage
Storage Areas

A.I.A. 35-E-12

Mutschler

CUSTOM DESIGNED SCHOOL DEPARTMENTS



FOODS AREA has built-in range and oven, pastry center, roll-away utility cart, towel storage, ventilating fan and range hood, adequate storage.



CLOTHING AREA showing modern sewing table with re... accessible tote drawers and cabinet storage. Note in backgro... the by-passing chalk and cork boards with storage space be...



LIVING AREA showing triple-mirror wardrobe, filing case, mag-azine case with chart storage below, ironing board and linen case, rollaway bed storage.



ART ROOM completely equipped with latest design of st... and special-purpose cases . . . arranged to give most e... working area possible.



LAUNDRY AREA designed as those in better homes of today, beautifully styled as well as efficient. Also notice planning desk and storage space.



CRAFTS ROOM planned by Mutschler specialists. ... handsome modern appearance, as well as complete facilities p... vided for a variety of handicrafts.

Mutschler
SCHOOL EQUIPMENT

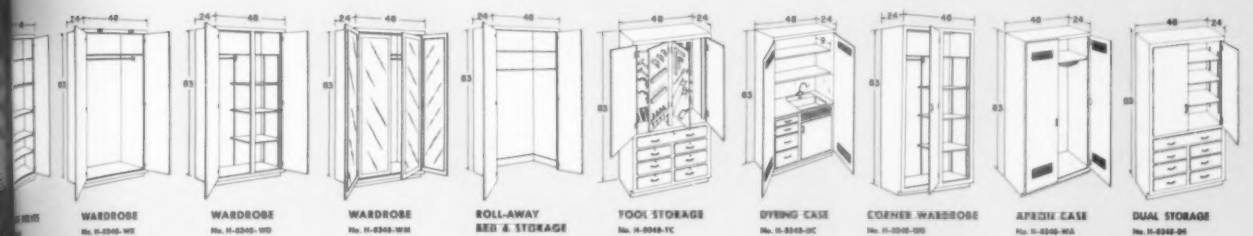
Delivered to job complete—doors hung ready for installation. Precision built of selected kiln-dried hardwood. Exclusive marine grid, hollow core doors—light weight, permanent fit. Smooth 80 sheen synthetic enamel finishes in color, white, Imperial Maple, or Driftwood Maple. Institutional hardware in brass or chrome finish. Continuous counter and sink tops of linoleum, stainless steel, Formica or edge-grain maple. Inserts of maple or stainless steel may be any size.

MUTSCHLER BROTHERS CO. – NAPPANEE, INDIANA

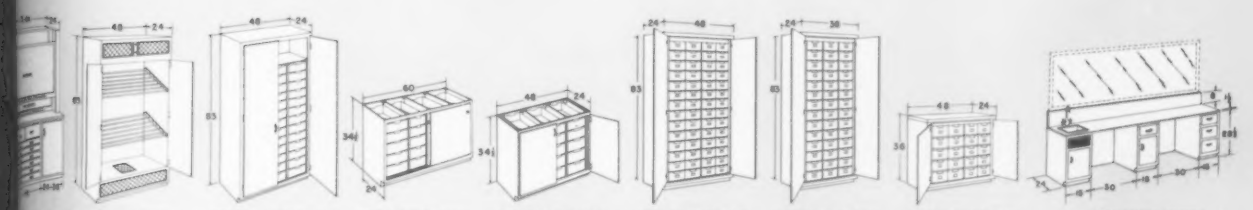
HOMEMAKING CABINETWORK



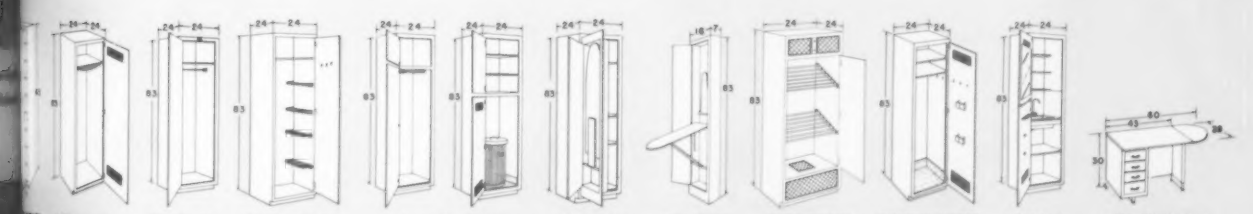
FILING CASE
CHILD CARE CASE
OPEN COMPARTMENT CASE
IRONING BOARD CASE
FOODS STAPLE CASE
CLEANING UTENSIL CASE
EQUIPMENT STORAGE
ILLUSTRATIVE MATERIAL
CHART & MAGAZINE CASE



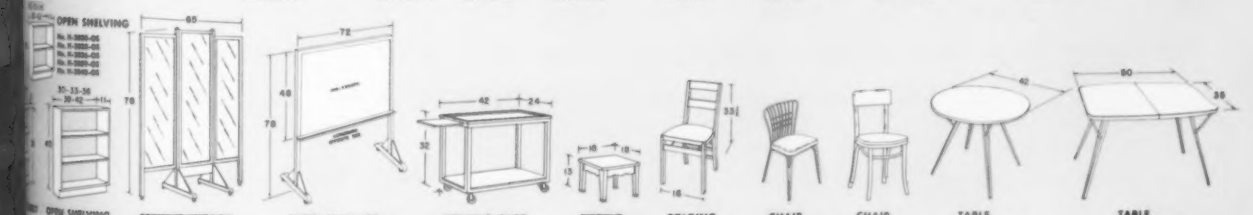
WARDROBE
WARDROBE
WARDROBE
ROLL-AWAY BED & STORAGE
TOOL STORAGE
DYEING CASE
CORNER WARDROBE
APRON CASE
DUAL STORAGE



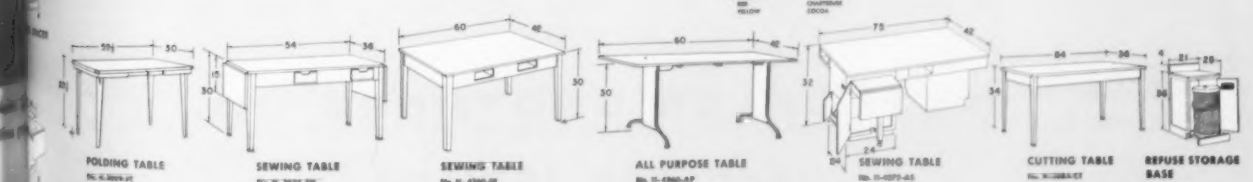
DISPLAY CASE
DRYING CASE
TOTE DRAWER CASE (Fibre trays)
TOTE DRAWER CASE (Fibre trays)
TOTE DRAWER CASE (Fibre trays)
TOTE DRAWER CASE (Wood drawers)
TOTE DRAWER CASE (Wood drawers)
TOTE DRAWER CASE (Wood drawers)
GROOMING CENTER



APRON CASE
WARDROBE
IRONING BOARD CASE
APRON CASE (Double door)
REFUSE STORAGE
IRON BOARD CASE
IRON BOARD CASE
TOWEL DRYING CASE
CLEANING UTENSIL CASE
LAVATORY CASE
INSTRUCTORS DESK



OPEN SHELVING
SEWING MIRROR PORTABLE
DISPLAY BOARD
SERVING CART
FITTING STAND
FOLDING CHAIR
CHAIR
CHAIR
TABLE
TABLE



FOLDING TABLE
SEWING TABLE
SEWING TABLE
ALL PURPOSE TABLE
SEWING TABLE
CUTTING TABLE
REFUSE STORAGE BASE

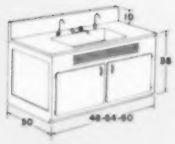
NOTE: All specifications and materials subject to change without notice.

Mutschler
SCHOOL EQUIPMENTS

Delivered to job complete—doors hung ready for installation. Precision built of selected kiln-dried hardwood. Exclusive marine grid, hollow core doors—light weight, permanent fit. Smooth 80 sheen synthetic enamel finishes in color, white, Imperial Maple, or Driftwood Maple. Institutional hardware in brass or chrome finish. Continuous counter and sink tops of linoleum, stainless steel, Formica or edge-grain maple. Inserts of maple or stainless steel may be any size.

MUTSCHLER BROTHERS CO. – NAPPANEE, INDIANA

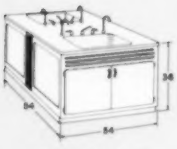
ARTS AND CRAFTS ROOM



SINK BASE



INTERCEPTOR TRAP



END PENINSULA UNIT



TEACHERS DESK



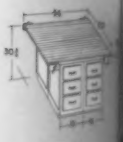
SPRAY BOOTH



WORK BENCH



WORK BENCH



WORK BENCH



RADIATOR INCLOSURE



ART BENCH



ART HORSE



DEEP OPEN SHELVING



SHALLOW OPEN SHELVING



SHOW CASE



SECTIONAL STORAGE



ART TABLE



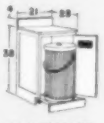
WORK TABLE



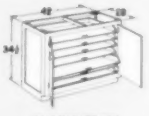
CLAY CART



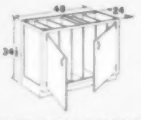
CLAY STORAGE BIN



CLAY STORAGE



SLIDING TRAYS



DRAWING BOARD STORAGE



LOW DRAWER STORAGE



FILE DRAWER



LOW DRAWER STORAGE



LOW TALL STORAGE



LOW TALL STORAGE



PAPER STORAGE



DRAWER STORAGE



DRAWER STORAGE



TALL STORAGE



TALL STORAGE



SLIDING TALL STORAGE



WALL CABINET



WALL CABINET



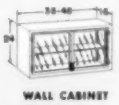
WALL CABINET



WALL CABINET



WALL CABINET



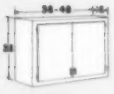
WALL CABINET



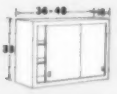
WALL CABINET



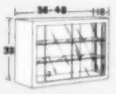
WALL CABINET



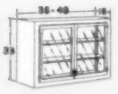
WALL CABINET



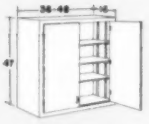
WALL CABINET



WALL CABINET



WALL CABINET



WALL CABINET



WALL CABINET



NOTE: All specifications and materials subject to change without notice.

MUTSCHLER BROTHERS CO.

NAPPANEE, INDIANA



Charles Eliot Junior High, Cleveland, Ohio

a catalog of

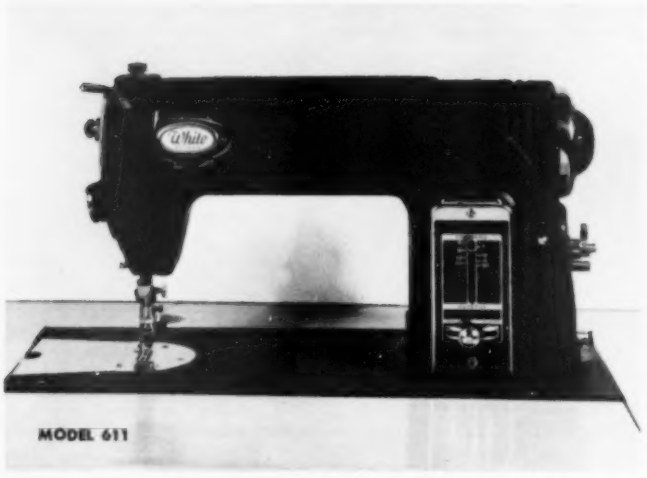
WHITE SEWING MACHINES

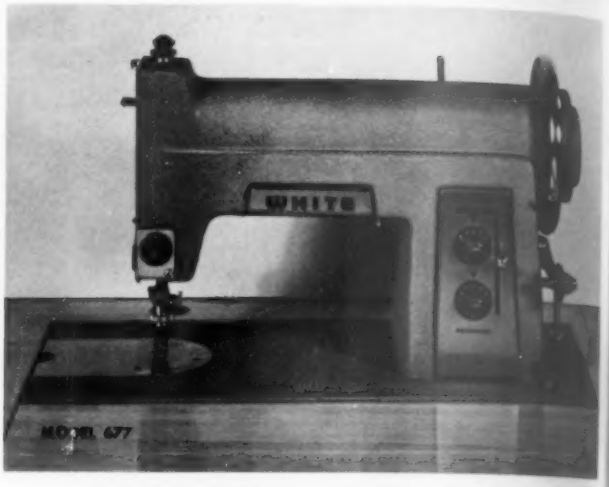
proved best suited to classroom use*

- Accepted models with White's exclusive **full power speed selector.** (Makes teaching easier.)
- Policy of **priority service** to school installations.
- **Very attractive prices** and flexible financing for schools. Courtesy discount for teachers and officials.

*SOME RECENT TYPICAL INSTALLATIONS: Chicago, 170 machines; Cleveland, 100; Dallas, 76; Detroit, 157; Hazel Park, Michigan, 27; Independence, Iowa, 20; Los Angeles, 206; Stockton, California, 48.

Standard equipment in thousands of classes

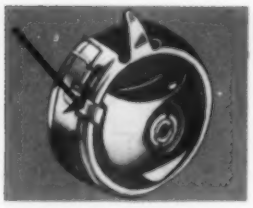




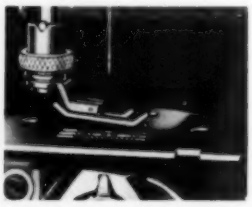
WHITE SEWMASTER WHITE DELUXE

both machines valued by teachers for simplicity of operation

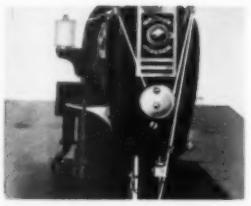
Teachers tell us teaching is easier with these Whites. All adjustments are simple and clearly defined. Both have White's exclusive speed control, especially important to beginners. (See details at right) Both have all features illustrated below, and many more. The Sewmaster has extra space under the sewing arm and can double as a portable. The DeLuxe is a new model which still retains all the fine qualities of the justly famous White "77". Like all Whites, these two classroom favorites are known for their ability to stand up to long, hard use with minimum maintenance. A full set of time-saving attachments comes with each machine. Please write us for details and exact specifications.



Bobbin Tension adjusts with a simple lever, not a screw. No tools required, and the setting is always visible.



Four-point Feed means there are two guide bars on either side of needle. Material *must* travel through in straight line.



One-hand Threading is so easy a beginner can learn it in just minutes. After a class or two, it's "automatic," a timesaver.



Numbered Indicators for both tension and stitch-length. The student doesn't have to guess at the settings.



Full Rotary Bobbin makes continuous revolutions, not stop-and-go type. This reduces vibration at the needle.



Sturdy Steel Stand, Style 119
famous for its ability to stand up under hard use. Cabinet in birch or walnut.
Working space open, 48½" x 18"
Floor space closed, 34¼" x 18"

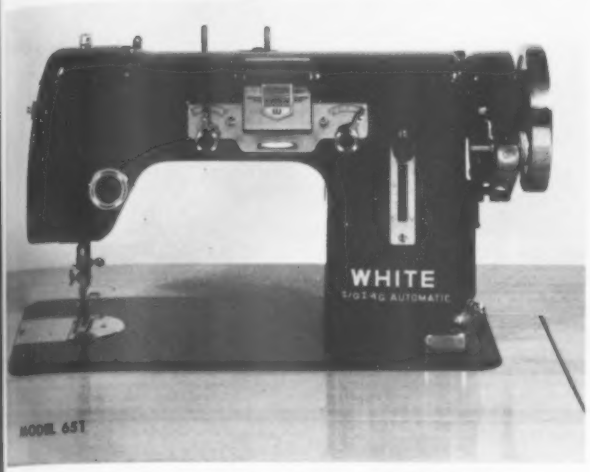


Modern Table, Style 21
first choice in schools of contemporary design. In limed oak or light walnut.
Working space open, 46¼" x 17⅜"
Floor space closed, 23⅝" x 18⅛"



Maple Table, Style 117
a traditional Early American desi
with beautiful, solid cabinetry.
Working space open, 54¾" x 17½"
Floor space closed, 27½" x 18"

Every class should have at least one WHITE ZIG-ZAG AUTOMATIC



THE BEST FULLY AUTOMATIC MACHINE FOR SCHOOLS

Of all the automatics, the White is considered the simplest, the easiest to operate. Stitch selectors are clearly marked, and hundreds of distinctly different decorative stitches are made without attachments. When desired, machine flicks to straight stitching instantly. Teachers say it's a real pleasure; ten minutes instruction is par.



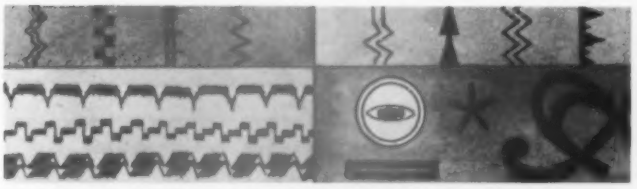
Decorator Discs slide in, slide out. No tools or levers needed to change to another stitch.



Handy Dial selects decorative stitches, permits changes without removing disc.



Drop-feed Lever located on topside of machine for easy darning, embroidery, monograms.



DECORATOR STITCHES

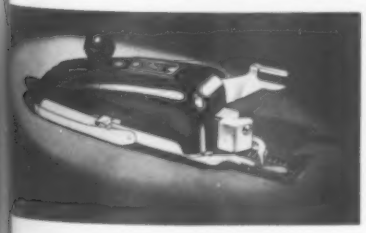
and dressmakers' specialties, including buttonholes, come easy on the White automatic zig-zag. Above, just a *few* of the many types your classes can make. And twin needles are available (see right) for two-color designs in any selection of stitches.



FULL-POWER SPEED SELECTOR of prime importance in teaching

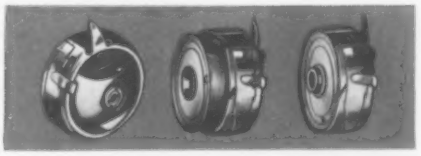
This patented device, found only on White machines, *delivers full power to the needle no matter how slowly the machine is operated.* This leaves the operator's hands free for guiding; there's never any need to touch the handwheel. *The needle won't stall*, even at slowest speeds in heaviest fabrics. And there can't be any runaway stitching since there is a positive control of speed at all times. Wonderful for *anyone* who sews, *really important* for beginners. As suppliers to schools for many years, we've been impressed by the way teachers praise White's speed control above any other feature.

ACCESSORIES



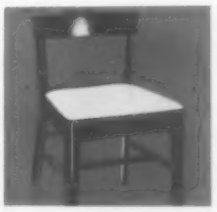
White Buttonholer

on any White straight-stitch machine. Easy to attach.) Unless the operator is expert, this is still the best way to make buttonholes, since they are made with a template, and will be identical. The buttonholer is not one of the many accessories supplied free, but schools find it well worth the modest extra cost.

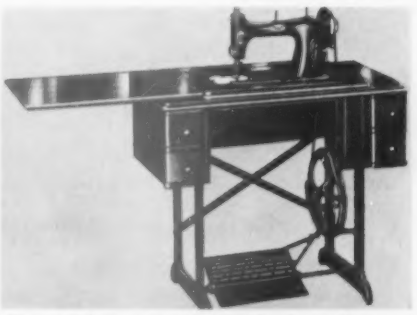


Discount on Supplies, Parts

Bobbins, bobbin cases and parts are all available to schools at White's special discount prices.



Posture Chair for sewing with White machines has "well" seat for storage, is just right height.

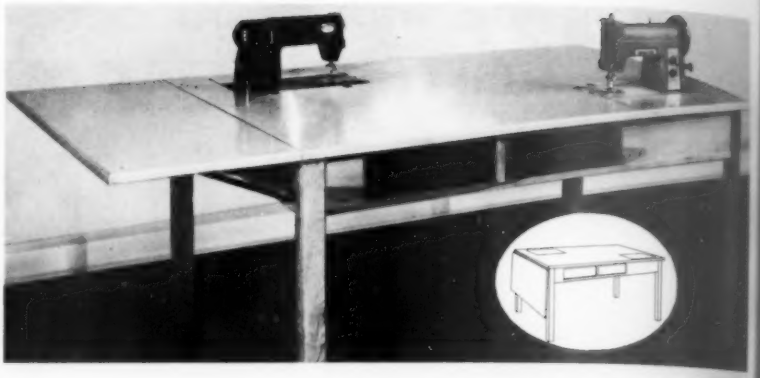


For Elementary Schools Where a Treadle Machine is Preferred

Note that the treadle is placed so that the student is seated squarely before the needle. Head is full rotary Standard model, sews perfectly on all materials from the finest chiffon up to 10-oz. denim and canvas.

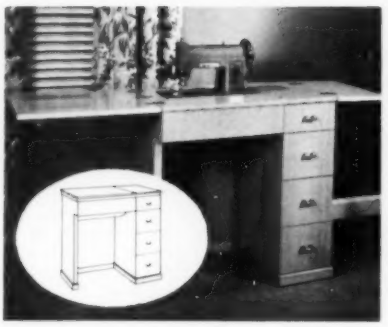
SPECIAL INSTALLATIONS

We built a sewing and cutting table to a school's specifications—a special order. It was so much admired that we're making it part of our line. It is 64″ long, 42″ wide, 30″ high. The two heads (optional models) are arranged for the greatest possible amount of sewing space—more than is available on any other such table made. With heads down, leaf up, it's a 3,444-square-inch cutting table. Tote tray openings are 16″ x 16″ x 4½″.



SPECIAL CABINETS

We have a reputation for sound craftsmanship in our cabinetry—schools find that White cabinets have a way of outlasting others. Page 2 shows the usual school models, but for a home atmosphere we suggest (see right) our beautiful style 17 desk model in blond modern or our space-saving kitchen or laundry room model, style 785.





TEACHING AIDS

In addition to the full and complete kit of teaching aids which White has always furnished, there are now regular mailings of White *Sew-Easies*, leaflets which offer subject matter for teachers—everything from helpful hints to "how-to's." They are much in demand. Perhaps of more importance, White's regional representatives will be glad to arrange demonstrations and special classes *for* teachers. This is particularly helpful with new machines—or new teachers. And our policy of priority service to schools may not be a "teaching aid," but it is certainly an aid to teachers.

General Information on White

If you've done business with us before, you know we're an American company, located in Cleveland, Ohio, and we've been making sewing machines since 1876. We guarantee, *fully guarantee*, every machine that carries our label, whether straight-stitch or zig-zag automatic. In both classifications, we believe White offers the outstanding machines being made today—and for good reason.

We have made White sewing machines easier to sew with.

We make the mechanism as simple as possible. Then we make it with precision, and we make it to last. For instance, White machines can't get out of timing—that part of the machine is pin locked, can't work loose.

Schools find us good people to deal with. Our school discount is exceptionally generous. Our guarantee has meaning. And our service policy is for *priority to schools.*

We hope we can be of help to you. A letter will bring a White representative to you promptly, with all the facts and, if you wish, a demonstration. You are under absolutely no obligation, of course.

Please address correspondence and orders, Attention "Department of Special Services"

White Sewing Machine Corporation

Cleveland 11, Ohio

The manufacturer reserves the right to change specifications and to add or withdraw models at any time.

Form S-34

WOOD-METAL®

E-3/Wo

Custom-Designed
EQUIPMENT
Colonial and Contemporary in 8 Natural Woods and 12 Decorator Colors

TYPICAL CONTEMPORARY INSTALLATION



HOMEMAKING DEPARTMENTS



TYPICAL COLONIAL INSTALLATION

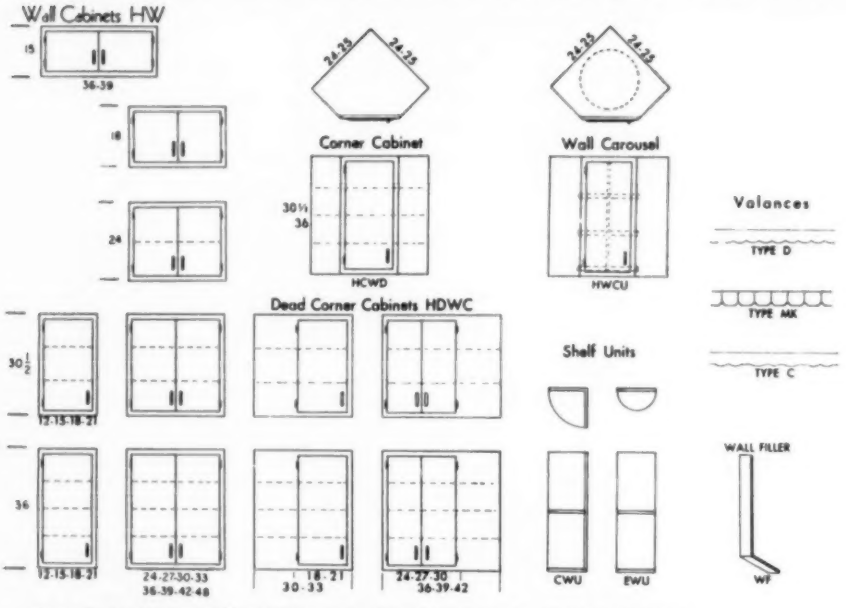
binets, casework and furniture
r schools meet the school admini-
rator's requirements of maximum utility
d service. Further, they fit the modern
ducator's concept of "beauty-conditioned" school facilities

WOOD-METAL industries, inc.

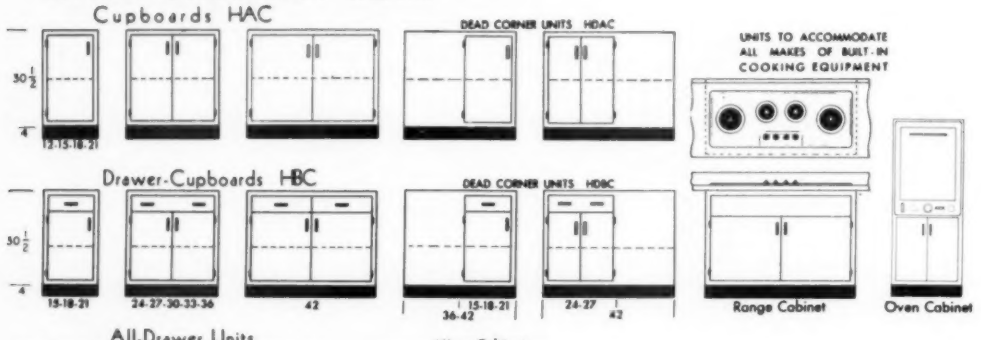
KREAMER • SNYDER COUNTY • PENNA.

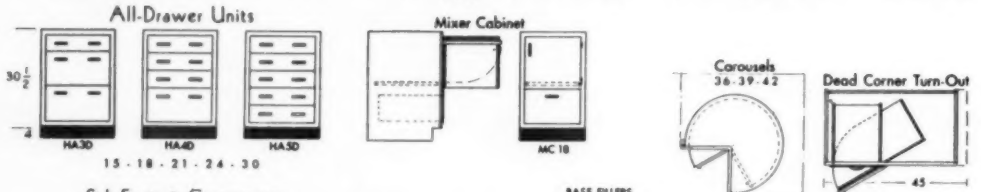
WOOD-METAL CABINETS

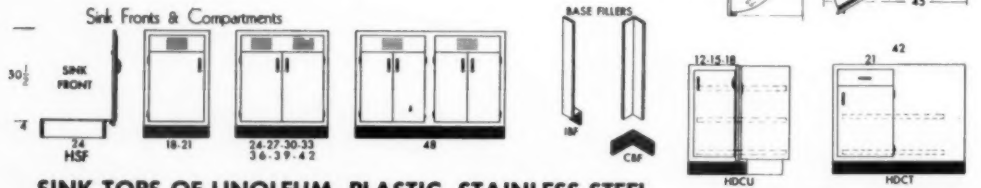
WALL UNITS — HW — 12½" DEEP. TO SPECIFY USE IDENTIFYING LETTERS FOLLOWED BY WIDTH AND HEIGHT (FOR EXAMPLE - HW - 2430 ½).



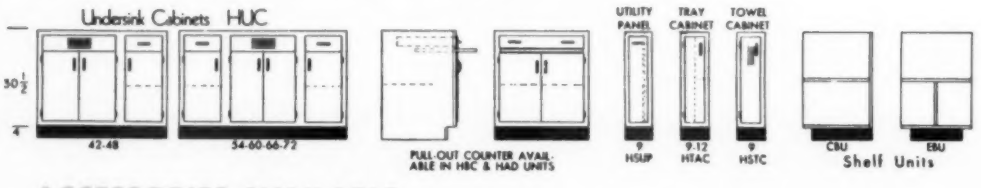
BASE UNITS 24" DEEP. TO SPECIFY USE IDENTIFYING LETTERS FOLLOWED BY WIDTH.







SINK TOPS OF LINOLEUM, PLASTIC, STAINLESS STEEL, HARDWOOD AND VINYL TO FIT ALL REQUIREMENTS



ACCESSORIES AVAILABLE:

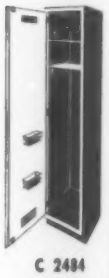
BREAD BOX • CUTLERY TRAY • SLICING BOARD • SOAP RACK • TRAY RACK • SLIDING DRAWERS • SLIDING TOWEL ROD • SLIDING FLUTED GLASS DRAWERS • STEP SHELF • CUPHOOK RACK • GLASS DOORS

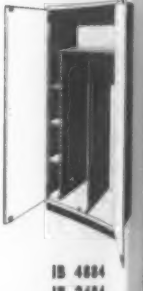
CASEWORK

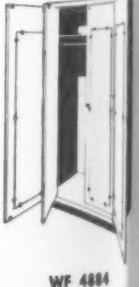

ST 4830


FP 1818


AP 6042


C 2484


IB 4884
IB 2484


WF 4884


CS 4884

and FURNITURE



OS 3628
OS 2428



SC 4325



RT 4123



CH 28



DK 4332



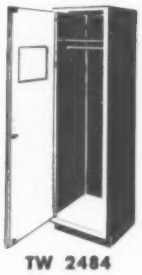
MR 3618



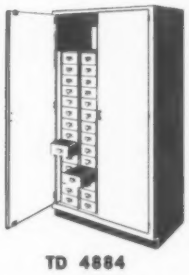
TD 4836



FC 3647
FC 3647A



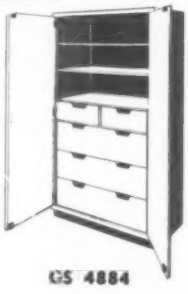
TW 2484



TD 4884



RC 2484



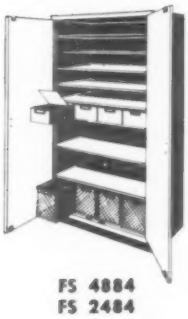
GS 4884



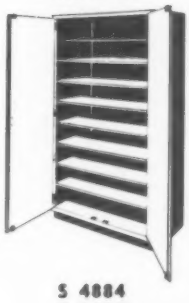
WR 4884
WR 2484



IB 4884



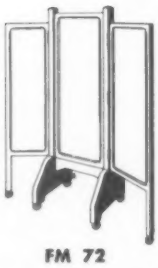
FS 4884
FS 2484



S 4884
S 2484



WF 2484



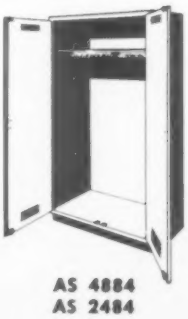
FM 72



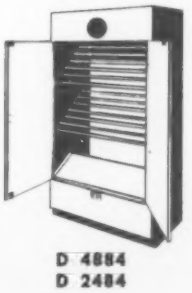
DWR 4884



IM 4884



AS 4884
AS 2484



D 4884
D 2484

OS 3628 OPEN SHELF UNIT 36" W x 28" H x 12½" D, has fixed shelves.

OS 2428 OPEN SHELF UNIT, same as above except 24" wide.

ST 4830 CUTTING TABLE 72" x 30" open, 48" x 30" closed, 36" high, with two 15" drop leaves and hardwood top.

SC 4325 SERVING CART 43" L x 25" W x 36" H, with pull-out shelf. Top material as specified, with hardwood edging. Hard rubber ball-bearing casters.

RT 4123 REFECTORY TABLE 41" x 41" open, 41" x 32" closed, 30½" high; two 9" leaves slide under top. Top material as specified.

CH 28 CHAIR, extra heavy duty, blonde finished hardwood.

DK 4332 Desk 43" W x 32" D x 30½" H, has linoleum top, file drawer, three shallow drawers, and pull-out shelf. Knee space drawer has lock.

FP 1818 FITTING PEDESTAL 18" L x 18" W x 12" H, has black Presdwood top with hardwood edging, and rubber shoes.

AP 6042 ALL-PURPOSE TABLE 60" L x 42" W x 30½" H, accommodates four tote drawers, top of black tempered Presdwood with hardwood edging.

TD 4836 LO-BOY TOTE DRAWER CABINET 48" W x 36" H x 24" D, has 24 tote drawers. Tote drawers may be of hardwood or steel. Top material as specified. Also can be had with 18 larger size tote drawers.

MR 3618 MAGAZINE RACK 36" W x 18" H x 12" D.

FC 3647 FILE CASE 47" H x 36" W x 24" D, has three letter size and three legal size drawers. Top material as specified.

FC 3647A FILE CASE, same as above except with six letter size drawers.

TW 2484 TEACHER'S WARDROBE 24" W x 84" H x 24" D, has fixed shelf, clothes bar, mirror, and lock.

TD 4884 TOTE DRAWER CASE 48" W x 84" H x 24" D, with 56 tote drawers. Tote drawers may be of hardwood or steel. Also can be had with 42 larger size tote drawers.

C 2484 CLEANING UTENSIL STORAGE 24" W x 84" H x 24" D with two fixed shelves, six hooks, and two soap and powder racks. Bottom and 8" of sides and back have black Presdwood lining.

RC 2484 REFUSE CONTAINER CASE 24" W x 84" H x 24" D, 8" high black Presdwood protective lining, upper section has three fixed shelves.

GS 4884 GENERAL STORAGE CASE 48" W x 84" H x 24" D, with two drawers, three large trays on progressive ball-bearing slides, and two adjustable shelves.

WR 4884 WARDROBE 48" W x 84" H x 24" D, has fixed shelf, one adjustable rod and one fixed rod.

WR 2484, same as above except 24" wide and with one door.

IB 4884 IRONING BOARD STORAGE 48" W x 84" H x 24" D, with two compartments for ironing boards and four asbestos covered shelves for irons.

IB 2484, similar to above except 24" wide and with one door.

BS 4884 FOLDING BED STORAGE 48" W x 84" H x 24" D, with one fixed and one adjustable shelf.

FS 4884 FOOD STORAGE CASE 48" W x 84" H x 24" D, with four metal vegetable bins, four tinned canisters, and eight adjustable shelves.

FS 2484 FOOD STORAGE CASE, same as above except 24" wide and with one door, two vegetable bins and two canisters.

S 4884 STORAGE CASE 48" W x 84" H x 24" D with eight adjustable shelves.

S 2484 STORAGE CASE, same as above except 24" wide and with one door.

WF 4884 WARDROBE FITTING CASE 48" W x 84" H x 24" D, four doors equipped with full length mirrors, fixed shelf, and clothes rod.

WF 2484 WARDROBE FITTING CASE 24" W x 84" H x 24" D, with three doors equipped with full length mirrors, fixed shelf, and clothes rod.

FM 72 PORTABLE FITTING MIRROR 72" H, center mirror 54" x 20", side mirrors 50" x 16"; mounted on hard rubber casters.

DWR 4884 DEAD CORNER WARDROBE 48" W x 84" H x 24" D, has four adjustable shelves, one fixed shelf, and pull-out clothes hanger. Indicate dead corner to left (L), or right (R). L illustrated.

CS 4884 CHART STORAGE CASE 48" W x 84" H x 24" D, has rods for 12 charts, which may be suspended from hooks in top stile, upper section has two adjustable shelves.

IM 4884 ILLUSTRATIVE MATERIAL CASE 48" W x 84" H x 24" D, has two file drawers, four shallow drawers, and two adjustable shelves.

AS 4884 APRON STORAGE CASE 48" W x 84" H x 24" D, has two revolving racks with hooks for 96 aprons, and fixed shelf.

AS 2484 APRON STORAGE CASE, same as above, except 24" wide and with one door and one rack, capacity 48 aprons.

D 4884 TOWEL DRYER 48" W x 84" H x 24" D with 14 removable towel rods, electric hot air blower, stainless steel baffles, and bulls-eye switch.

D 2484 TOWEL DRYER, same as above except 24" wide and with one door.

Specify left or right hinge for single door units.

WOOD-METAL EQUIPMENT FOR HOMEMAKING DEPARTMENTS

Construction and finishing details

SPECIFICATIONS:-

a. materials

Lumber: All exposed wood parts shall be of the finest selected northern grown hardwoods for natural finished cabinets and cases and of the finest select hardwoods for enameled cabinets and cases. Hardwood for interiors shall be unselected but sound. All lumber shall be properly seasoned and scientifically kiln dried to 6% or less moisture content and them tempered before fabrication.

Plywoods: All plywoods for exposed surfaces of natural finished cabinets and cases shall be of select Birch or Maple.

b. parts

Doors: Shall be 1" thick of flush construction of select hardwood plywood for natural finished units and of grainless tempered Presdwood for enameled units, laminated to both sides of kiln dried edge grain frame, with grilled interior giving maximum warp resistance. DOORS to be lipped for dust proofing with a uniform 3/8" radius on four edges.

Drawers: Heads shall be 1" thick of same materials and construction as doors except small drawer heads shall be of solid lumber core or of select hardwood. Sides shall be 1/2" thick, tongued, and grooved and glued into heads, with 1/2" thick backs tongued, grooved, and glued into sides. Bottoms shall be plywood for natural finished cabinets and grainless tempered Presdwood for enameled units, let into front, back and sides.

Drawer Slides: Shall be of heavy 16 gauge cadmium plated cold rolled steel with double ball-bearing rollers on each side, four ball-bearing rollers to each drawer with automatic stops, permitting the drawer to be readily removable by tilting up or down.

Sides: Exposed sides shall be 3/4" thick flush construction of same material and essentially same construction as doors. Concealed sides shall be flush or of panel construction. Sides shall be tongued, and glued into front frames, with glue blocks or angle irons for additional reinforcement, eliminating the use of nails through front frames. The use of nails through front frames will not be acceptable.

Tops and Bottoms: Shall be 3/4" thick of plywood or of same construction as doors dadoed and glued into sides and overlap hanging strips which fit in the recessed back insuring maximum hanging strength. Tops which are not dadoed, and glued into sides and which no not overlap hanging strip, will not be acceptable.
Bottoms of base cabinets shall be of plywood or grainless tempered Presdwood, dadoed into sides resulting in tight sanitary corners.

Front Frames: Shall be 3/4" thick by 1 3/4" wide, with concealed mortised and tenon joints, glued and metal doweled. Unsanitary open mortise and tenon joints in front frames will not be acceptable. Front frames shall be grooved and glued to sides eliminating nails through front frames.

Shelves: Shall be heavy 3/4" thick and adjustable in all wall cabinets and storage cases eliminating any sag or droop. Base cabinet shelves are 3/4" depth and fixed.

Backs: Shall be of plywood for natural finished and of grainless tempered Presdwood for enamel finished wall cabinets and cases. Backs shall be of grainless tempered Presdwood for base cabinets. Backs shall be let into sides of wall and base cabinets. Wall cabinet backs shall be fitted with top and bottom strips fitted inside recessed back for anchoring cabinet rigidly to wall.

Subbases: Coved rubber base molding shall be supplied as indicated.

Tall Cases: Front frame shall be 1 1/8" thick by 1 3/4" wide with concealed mortise and tenon joints, glued and metal doweled. Doors, and sides to be flush and of same material and construction as for wall and base cabinets. Backs to be of plywood for natural finished units and of grainless tempered Presdwood for enameled units, dadoed into sides, securely fastened to top and bottom frames, and further reinforced with glue blocks. Backs to be recessed. Tops and bottoms to be of plywood for natural finish and grainless tempered Presdwood for enameled units, on frames which are securely glued and screwed into sides and front frame. Shelves shall be heavy 3/4" thick and adjustable.

c. hardware

Hinged doors for all wall and base cabinets and cases shall have 2 1/2" high by .072" thick heavy duty, bronze or chrome institutional type five-knuckle pin hinges so designed to eliminate cutting through door lip to hang to frame. Offset kitchen cabinet type hinges will not be acceptable. Hinge screws shall be concealed when door is closed. Doors under 44" high shall have one pair of hinges and those over 44" high shall have 1 1/2 pairs of hinges. Pulls to be streamlined solid chrome plated or bronze institutional type.
Drawers under 27" wide to have one drawer pull and those 27" wide and over to have two pulls.
Sliding wall and base cabinet doors to have fiber sheaves and track. Sliding case doors to have Grant Pully No. 2010 metal track and No. 2020 sheave. Catches to be heavy, positive, silent, rubber roller type.

d. finish

Natural Finish: To be obtained by a thorough sanding followed by one of WOOD-METAL's standard stains. Surface then to receive a thorough coat of penetrating sealer. When thoroughly dry, surface to be thoroughly sanded and to be finished with highest grade of semi-gloss clear acid and alkali resistant varnish.

Enameled Finish: To be obtained by thorough sanding of cabinets and cases, followed by application of highest grade primer coat. When thoroughly dry, the prime coat shall be carefully sanded, and then receive highest grade enamel finish, in WOOD-METAL's standard white or in any of WOOD-METAL's eleven standard colors. The interior surfaces of the cabinet and bottom of wall cabinets shall be given the same careful finishing process as the exterior of the cabinet. The underside of base cabinets and cases and exposed backs of all cabinets shall be given a heavy sealer coat.

Sink and Counter Tops:
Sink and counter tops shall be constructed of 3/4" thick exterior grade plywood. Surface material of linoleum, plastic, vinyl or stainless steel* shall be glued with water-proof glue and heavily pressed by special presses to plywood, insuring a thorough bond.
Front and side edges shall be trimmed with 1 1/2" non-drip stainless steel edging and all corners shall be neatly mitred and soldered.
Back splashers of heights as specified shall be properly screwed to deck and joint sealed with stainless steel cove molding to insure against water leakage. Top and sides of back splashers shall be trimmed with 1" stainless steel edging.

Sink Bowls: Shall be of stainless steel, porcelain on steel or enameled cast iron, single bowl or double bowl as specified. They shall be securely fastened from the underside of sink top with clamps secured by special expansion bolts into the bottom of the top, thereby insuring smooth surfaces free from any surface marring. Bowls shall be sealed to 1" stainless steel channel with water-proof mastic.
* Specifications for welded one-piece stainless steel tops available on request.

Faucets and Strainers: Faucets shall be of the deck type, chromium plated and with or without hose spray or aerators, as specified. Strainers shall be chromium plated crumb cup type.

(Specifications subject to change due to government regulations, defense supply conditions or other emergencies beyond our control.)

For further information, write Wood-Metal Industries, Inc., Kreamer, Snyder County, Pennsylvania, or get in touch with your nearest Wood-Metal representative.

REPRESENTATIVES

Alabama, Mobile
Shearer & Rayford
157½ St. Louis St.

California, Los Angeles
Austin Bentley Seating Co.
529 N. LaCienega Blvd.

Colorado, Denver
Horbilt & Co.
2329 Champs St.

Connecticut, Danielson
M. J. Juhola Co.
Boinneville St.

Georgia, Atlanta
Bradford Sales Co.
P. O. Box 2095

Illinois, Chicago
Harold A. Schwaig & Co.
3925 Belmont Avenue

Indiana
Overesch & Co.
2200 Losantiville Ave.
Cincinnati, Ohio

Louisiana, Baton Rouge
Frost Parker, Inc.
560 Florida St.

Louisiana, New Orleans
W. H. Grant, Jr.
208 Vincent Bldg.

Michigan, Detroit
W. D. Giardon Co.
13559 Mettetal

New York, Albany
Austin F. Loucks, Jr. & Co.
257 Quail St.

New York, New York
T. O. Gronlund Co.
101 Park Ave.

New York, Rochester
C. N. O'Brien Co.
1903 East Ave.

Ohio, Cincinnati
Smith & Schaefer, Inc.
1212 First Nat'l. Bank Bldg.

Ohio, Cleveland
Keeney-Schwank Asso.
3722 Lorain Ave.

Pennsylvania, Philadelphia
Wood-Metal Ind., Inc.
3652 Walnut St.

Pennsylvania, Pittsburgh
The Hughes-Ogilvie Co.
327 Fifth Ave.

Texas, Houston
Carroll Astor
2102 Colquitt

Washington, Seattle
Lowman & Hanford
1515 Second Ave.

West Virginia, Clarksburg
Kyle & Company
Court St. & Washington Ave.

W12-SSS

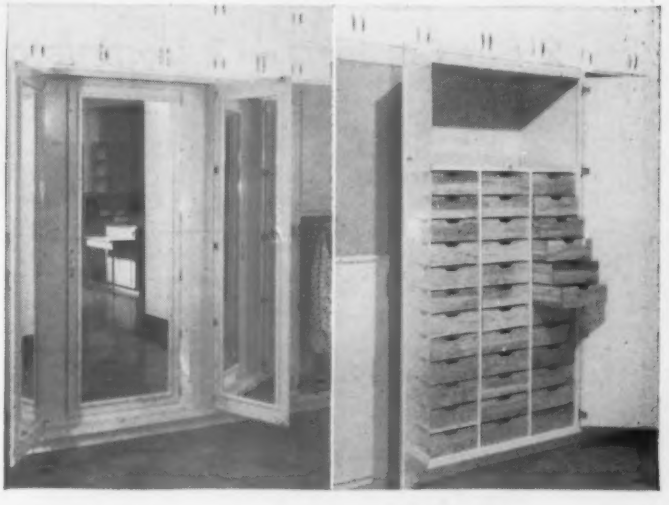
COPPES, INCORPORATED

Nappanee, Ind.

Furnishing Tomorrow's Classrooms—Today!



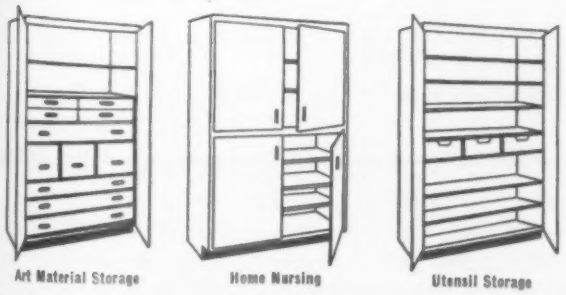
DURABILITY of northern hard maple



FLEXIBILITY of interchangeable case interiors

COPPES—NAPANEE SCHOOL EQUIPMENT

THE RESULT OF 80 YEARS EXPERIENCE BUILDING FINE FURNITURE



What better furniture to use in your "home" classes than that which has actually proven itself in the home! Since the days of Custer's Last Stand, *Coppes Napanee* have been building fine kitchen furniture—today recognized the world over as the very finest. This same traditional standard of quality—plus the long-lasting, modern-styling advantages of matchless wood cabinetry . . . 5-ply quality plywood shelving . . . interchangeable interiors . . . chrome polished hardware . . . and scientifically-applied high gloss enamel or wear-resistant "school finish" stain provide any school with living examples of "home economics" in the classroom.

Write today for Free Specification Folder showing the complete line of Coppes Napanee School Equipment for home economics, homemaking, art, and music classes.

Coppes Napanee

COPPES, INC. NAPPANEE, IND.

SINGER SEWING MACHINE CO.
149 Broadway, New York 6, N. Y.

TELL YOUR GIRLS NOW ABOUT THE 1955 SINGER JUNIOR DRESSMAKING CONTESTS!

Now's the time for a girl to plan her summer
...she may make a winning dress while she learns to sew!

2 Big Contests — 2 Complete Sets of Prizes Totaling Over

$85,000

SENIOR CONTEST PRIZES (girls 14-17)		JUNIOR CONTEST PRIZES (girls 10-13)	
GRAND PRIZE $1000	cash award or scholarship funds	GRAND PRIZE $500	cash award or scholarship funds
2nd PRIZE $ 750		2nd PRIZE $400	
3rd PRIZE $ 600		3rd PRIZE $300	
4th PRIZE $ 500		4th PRIZE $250	

PLUS a 3-day trip to New York City for the 4 top winners in each contest and their mothers!

66 SINGER* Slant-Needle* Portables with Automatic Zigzagger. 1st prize for Senior & Junior *regional* winners.

66 SINGER FEATHERWEIGHT* Portables with Automatic Zigzagger. 2nd prize for Sr. & Jr. *regional* winners.

Over 3500 De Luxe SINGER* Scissors Sets for *local* winners, Senior & Junior Contests.

PLUS 33 $300 one-year scholarships for regional winners in Senior Contest who enter or are attending accredited colleges and major in home economics!

NOTE: Families of employees of the SINGER organization and its advertising agencies are not eligible for contest.

SINGER will award one complete set of prizes to Seniors (girls 14-17) and one to Juniors (girls 10-13) for the best-made dresses!

To be eligible, girls must enroll in the SINGER Junior Dressmaking Course at a SINGER SEWING CENTER between May 2 and August 20, and complete their dresses by September 3. Eight 2½ hour lessons cost just $8! Entry blanks and rules are available at SINGER SEWING CENTERS in U. S. and Canada. Post this announcement today!

AT ALL **SINGER SEWING CENTERS**
in the United States and Canada

*A Trade-Mark of THE SINGER MANUFACTURING COMPANY. Copyright, U. S. A., 1955, by THE SINGER MANUFACTURING COMPANY. All rights reserved for all countries. SINGER SEWING MACHINE COMPANY.

CARROM INDUSTRIES, INC.

Ageless Wood Furniture for Dormitories

Ludington, Michigan



Built for longer life! The room scene shown above (No. 5036) is one of Carrom's five beautifully designed dormitory furniture groupings. Bed, No. 5036; Chest, No. 5432½; hanging mirror, No. 2828; desk, No. 5313; side chair with wood seat, No. 5007W; easy chair with slip cover, No. 5173; bedside table, No. 5005. Top of chest, desk and bedside table and arms of easy chair can be obtained with burn-proof Formica.

YOUR CHOICE OF 5 CARROM GROUP DESIGNS

Beautifully designed Carrom Dormitory Wood Furniture provides a *warmth* that is so ideal for study and relaxation. Constructed exclusively for institutional use and guaranteed to withstand the hardest usage, it assures outstanding durability. You have a choice of five differently designed groupings and of seven distinctive finishes.

Carrom Wood Furniture is priced with a view to institutional budget requirements. Carrom upholstery, springs and mattresses provide the utmost in comfort and years of trouble-free service.

If you are planning to buy a single piece, or furniture for an entire building, write for Carrom literature now.

CARROM INDUSTRIES, INC.

LUDINGTON, MICHIGAN

1955 . . . Our 66th Year



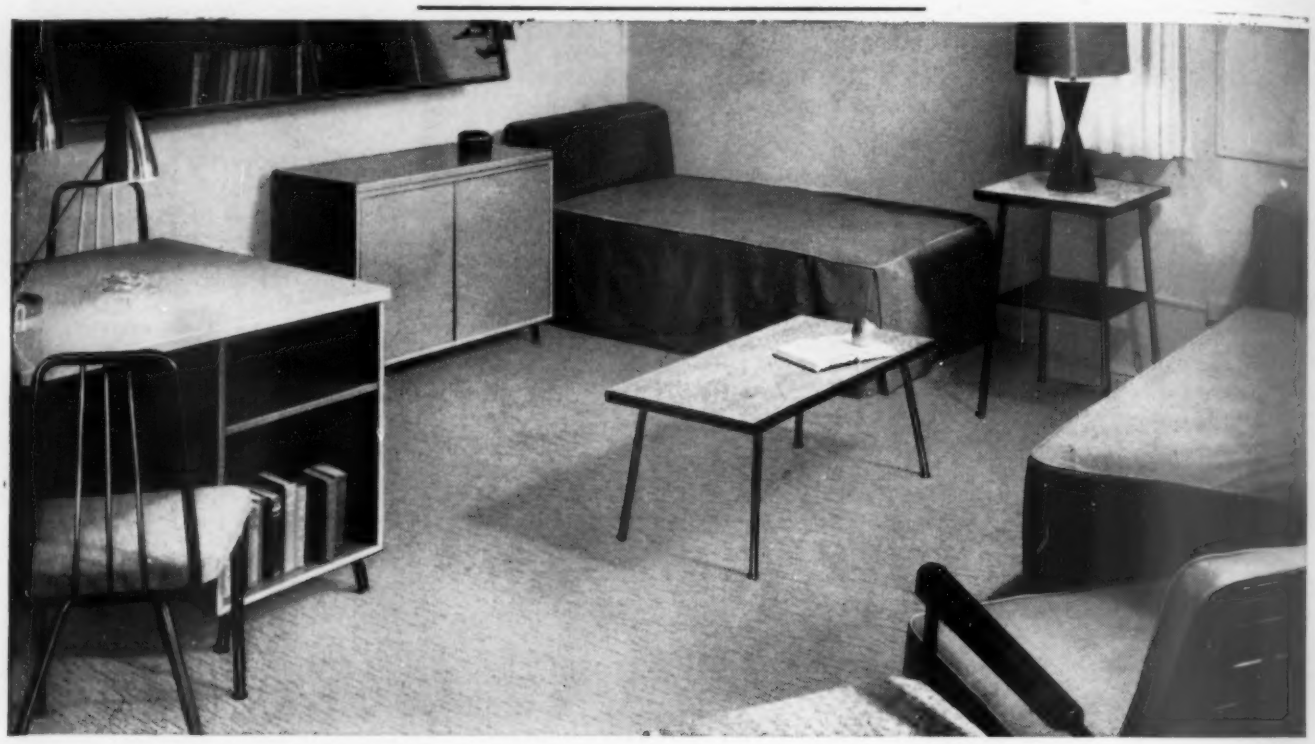
CARROM OFFERS YOU A MONEY-SAVING SERVICE!

If you want an intelligent analysis of wood furniture versus metal . . . or facts on durability, design, finish, construction and upholstery . . . or help in selecting specific types of beds, chairs, dressers and other pieces . . . or someone who can work with your interior decorator or architect to assure you a *real buy* in furniture . . .

WRITE FOR A CARROM MAN TODAY!

SIMMONS COMPANY

Chicago 54, Merchandise Mart
San Francisco 11, 295 Bay Street
Columbus 8, 1275 Kimmear Road
New York 16, One Park Avenue
Atlanta 1, 353 Jones Avenue, N.W.
Los Angeles 22, 3217 S. Garfield Avenue
Dallas 9, 8600 Harry Hines Boulevard



Beautiful...Versatile...

Theme

Dormitory Furniture

by SIMMONS

With beautiful Theme unit furniture, every room becomes a perfect haven for study...a room to relax in...a room to enjoy. Theme, created by the noted industrial designer, Mr. Raymond Spilman, is designed in modular units—every piece can be combined in a variety of pleasing arrangements for the most attractive and efficient use of available space. Color-coordinated Simfast finishes in decorator shades mean wider variety in room decoration. Welded steel construction means low maintenance, longer life.

The above room features Simmons' S-252 Beautyrest Sleep-Lounges; SF-385-1 Bookcases, SF-320-4 Duet Desk; SF-292-100 Sliding Panel Chest with Textolite top and SF-387-3 Mirrored Chest Top above; SF-601-200 Side Chairs, SF-611-210 Easy Chair; and SF-306-102 Table, SF-310-100 Coffee Table, and SF-305-101 End Table, each with Textolite top.

Ask your Simmons supplier to show you *Theme*—the appropriate, adaptable furniture that fits every room—every budget.



Theme Side Chair, SF-601-200. Beautiful, contrasting brass fillers, and your choice of fabrics or sturdy Naugahyde cover. SF-601-210, same, but with plastic capped arms.



Theme Easy Chair, SF-611-210. Inner-spring seat cushion, rubberized hair and felt back cushion, brass fillers, plastic arm caps, fabric or Naugahyde cover. 32" high, 23" x 22" seat, 25" x 29" floor area. SF-611-220, same, but with upholstered arm caps.



Theme Settee, SF-612-220. Two-seater, brass fillers, upholstered arm caps. Also available in three-seat size, SF-613-220. In either size, choice of upholstered or plastic arm caps to match Easy Chairs. Floor areas: 2-seat, 48½" x 28", 3-seat, 72" x 28".



Theme Recov Sectional Units. Right arm unit, SF-620-340; armless unit, SF-620-300; left arm unit, SF-620-350. Outstanding design gives life to dorm lobbies and waiting rooms. Group them any way you like. Choice of color and fabric. Arms fully upholstered.

SIMMONS COMPANY

Inviting...Comfortable... and it's Durable Steel!



Student Desk, F-330. Extra large top, 30" x 42", gives plenty of work space for engineering and architecture students. Sturdy, useful, double the book space of most desks, it's the most practical student desk ever built. Right-hand or left-hand models.



Duet Desk, F-152-21. Comfortable knee space on both sides, and plenty of work surface for two students. Each student has own drawer and bookspace. Saves cost of second desk. Top, 47½" x 32".

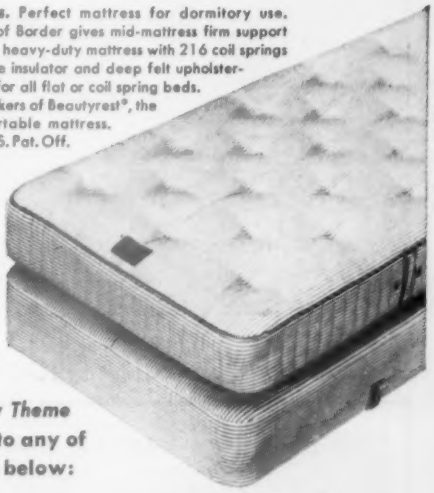


Demountable Double Bunk Bed, DB-5607 with L-1170 No-Sag Springs. Use these as attractive, durable twin beds—or where space is limited, as a sturdy, comfortable double bunk bed. Outside dimensions, bunk bed or each bed singly, 36" x 79". Height, double-decked, 62 3/16". Rugged all-steel construction with 1½" square posts and 20-gauge panels. No-Sag springs have excellent resiliency, give firm, sleep-inducing support.



Dorm Bed, H-348 with Coil Support, L-1601. All steel construction, and always dependable. Ribbon fabric SKC spring. Coil support L-1601, gives healthful firmness to spring, provides extra support and comfort to mattress.

Dorm-Bilt Mattress. Perfect mattress for dormitory use. Three-star Crushproof Border gives mid-mattress firm support right out to edges. A heavy-duty mattress with 216 coil springs covered with durable insulator and deep felt upholstering—your best buy for all flat or coil spring beds. Built by Simmons, makers of Beautyrest®, the world's most comfortable mattress. ®Trade-mark Reg. U.S. Pat. Off.



Theme Table, SF-310-102. A handsome study desk that can be moved about to serve as an occasional table as well. Legs have attractive double brass braces. 19½" deep, 39" long, 30" high. With *Theme* Bookcase, SF-385-1 which easily takes standard-size notebooks and large texts. 13" high, sturdy steel, many colors.

Theme Dresser, SF-291-001. 30" high, 19½" deep and 39" long. Comes in a wide variety of basic and accent colors and finishes and is modular-designed to combine with smaller or equal-size dressers, or extended with 19½" x 58½" vanity top.





Send for your copy of Simmons' new *Theme* catalog. Write to any of the addresses below:

SIMMONS COMPANY

CONTRACT DIVISION

DISPLAY ROOMS...

Merchandise Mart, Chicago 54 • One Park Avenue, New York 16 • 295 Bay Street, San Francisco 11 • 353 Jones Avenue, N.W., Atlanta 1 • 8600 Harry Hines Blvd., Dallas 9 1275 Kimmear Road, Columbus 8 • 3217 South Garfield Avenue, Los Angeles 22

SUPERIOR SLEEPRITE CORP.

CONTRACT DIVISION

759 S. Washtenaw Ave., Chicago 12, Illinois



Combines All Most Desirable Construction Quality Features With Greatest Long Term Economy



CT 650-57
CHEST-O-BED*

If limited space presents a problem, use Chest-O-Bed. Fully enclosed chest supplies drawer space equal to or greater than many three-drawer chests . . . and no extra floor space required! Complete with special, double deck coil spring.

* T. M. Reg. U. S. Pat. Off.

- **VITARITE* SYNTHETIC BAKED-ON ENAMEL FINISHES . . . easy to maintain. Permanently resistant to stains, burns, alcohol, and other dormitory use hazards.**
- **NON-WARPING, ALL METAL CASE CONSTRUCTION . . . assures life-long service with minimum maintenance troubles.**
- **ALL DRAWERS HAVE CENTER GUIDES and WOOD CENTER AND SIDE DRAWER RUNNERS . . . as well as rubber stops, giving smoothest, quiet drawer operation.**
- **SYNTHETIC RUBBER UNDERCOATING IN ALL CASE INTERIORS . . . efficiently minimizes sound noises to negligible level.**

Manufactured by skilled craftsmen, Superior Sleeprite's CT 650 suite embodies beauty of design, excellence of construction, and rugged durability unsurpassed. Beautiful Vitarite finishes in solid or two-tone colors, and grain finishes are available for any decorating scheme. Illustrated are: CT 4309 side chairs; CT 650-22LN double study desk; CT 650-4 chests; CT 650-10 beds; CT 650-6 nite table; and CT 4320 lounge chair.

* T. M. Reg. U. S. Pat. Off.

ADDRESS INQUIRIES TO: CONTRACT DIVISION
SUPERIOR SLEEPRITE CORP., 759 S. WASHTENAW AVE., CHICAGO 12, ILL.

THE SUPERIOR SLEEPRITE CORPORATION



CT 2650 CONVERTIBLE DOUBLE BUNK BED—Ruggedly constructed with 1½" square tubing and open panel ends. Easily converted for twin use. Over-all height, 62"; bottom spring height, 16"; top spring height, 53"; inside length, 76½"; width, 3/0.

Illustration shows choice of two spring applications. Top spring, as CT 2650/1, is 3-pc., 6" riser link fabric type with double hook corner locks. #7 Posture Coil Unit shown is detachable and available at extra cost. Bottom spring, as CT 2650/6, is 3-pc., 6" riser slat band type. CT 180 Chest-O-Bed Sections shown are detachable and available at extra cost.

All Metal Products Available in Finishes to Match Sleeprite Case Pieces



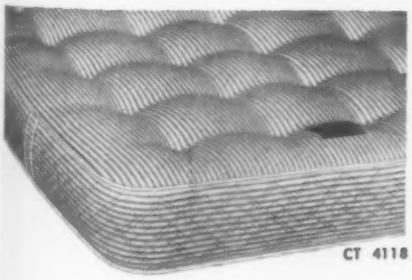


CT 650-7 DESK—Legs fabricated of 1½" square tubing for rigid durability. Drawer is equipped with center guide, wood drawer runners, and rubber cushioned drawer stop. Height, 30½"; width, 34½"; depth, 19".

CT 4650/6A DORMITORY BED—Open panel ends with 1½" square tubing. 3-pc., 6" riser slat band spring with heavy side rails of cambered oval tubing giving extra rigidity. Over-all height, 21½"; spring height, including rubber cushioned glides, 16"; width, 3/0.



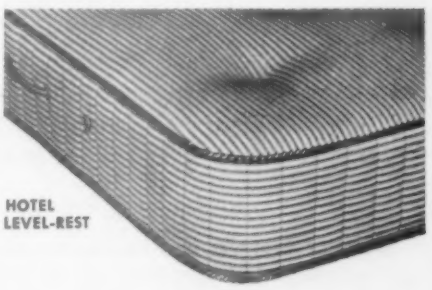
CT 4326 ARM CHAIR—Strong, 1-3/16" tubing. Seat and back upholstered with long wearing Duran or Naugahyde. 34½-in. high; seat, 18½-in. wide, 17½-in. deep.



CT 4118

CT 4118 INNERSPRING MATTRESS—209-coil, French inneroll construction (4/6). Sisal pad insulation, layer-cotton-felt upholstery. 6 1/5-oz. A.C.A. cover with droll stitched self border. Gray taped seams; taped strap handles; 8 vents. 3/3 or 4/6.

HOTEL LEVEL-REST INNERSPRING MATTRESS—Deluxe 312-coil unit. Sisal pad insulation; layer-cotton-felt upholstery. 1600-grade, 8-oz. A.C.A. ticking. Fancy taped seams; channel stitched border; genuine inneroll construction. 3/3 or 4/6.



HOTEL LEVEL-REST

SEDGWICK MACHINE WORKS

Manufacturers of Dumb Waiters and Elevators

156 West 15th Street, New York 11, N. Y.

The Maximum in Safety . . . The Ultimate in Economy — Since 1893

Nationwide Representation

General

Sedgwick Dumb Waiters and Elevators are products of specialization since 1893 in school and college installations throughout the country. Numerous types, sizes and capacities are available to meet different requirements and conditions. The main uses are briefly described below.

Food Service

Food supplies, dishes, and other cafeteria, lunch room, dining hall and kitchen loads are quickly and conveniently handled from floor to floor by means of SEDGWICK Electric Dumb Waiters or SEDGWICK Hand Power Dumb Waiters, depending on the individual requirements of service frequency, loads to be handled, and height of travel.

Library Service

Books can be sent without undue effort to the required stack levels or raised from basement storage space as required for distribution by using SEDGWICK Electric Dumb Waiters or SEDGWICK Hand Power Dumb Waiters.

Classroom Service

Books, stationery, crackers-and-milk lunches and general school supplies are systematically sent up or down by SEDGWICK Dumb Waiters without obstructing stairways with the handling of such loads. Electric or manual operation should be determined according to specific duty required.

Dormitory Service

Furniture, trunks, laundry hampers and other bulky and heavy loads are carried from floor to floor by SEDGWICK Hand Power Freight Elevators or SEDGWICK Hand Power Dumb Waiters used as trunk lifts.

Laboratory Service

Supplies and apparatus are safely and easily carried from storage or receiving room to laboratory floors above by SEDGWICK Electric or Hand Power Dumb Waiters conveniently located to save time and effort.

Laundry Service

Laundry hampers and trucks are carried in many laundry buildings on SEDGWICK Electric Dumb Waiters, SEDGWICK Hand Power Dumb Waiters or Freight Elevators.

Doors

SEDGWICK Steel Dumb Waiter Doors and Frames are designed to give dependable service in all of the previously mentioned applications. Doors are built in various types—bi-parting, single section slide-up or slide-down, or hinged, as desired. Access doors for machine space or clean-out are usually supplied. Approved Underwriters' Labelled construction is followed where called for.

Infirmary Service

The SEDGWICK Hand Power Hospital Elevator provides an economical and unfailing means of carrying patient on stretcher or bed. Meal trays are handled by SEDGWICK Electric or Hand Power Dumb Waiters.

Consultation

Our experience gained from many thousands of installations should be used in planning to best advantage installations of dumb waiters and elevators in school and college buildings. Write or telephone us for recommendations, layouts and specifications which will be gladly submitted at once.



"SEDGWICK Electric Dumb Waiter in Food Service"

F SCIENCE—SHOPS

1. Science Instruments

Westinghouse Electric Corporation	**F–1/We**
General Electric Company, Apparatus Sales Division	F 5–11
American Optical Company	F 12, 13
Klett Manufacturing Co.	F 14, 15
Federal Pacific Electric Products Co.	F 16
Weston Electrical Instrument Corp.	F 17–20

2. Laboratory Furniture

Kewaunee Manufacturing Company	**F–2/Ke**
Maurice A. Knight	**F–2/Kn**
Metalab Equipment Corp.	**F–2/Me**
Alberene Stone Corporation of Virginia	F 21
Laboratory Furniture Co., Inc.	F 22, 23
Duralab Equipment Corp.	F 24
The United States Stoneware Co.	F 25
Aluminum Greenhouses, Inc.	F 26
Lord & Burnham	F 27

3. Vocational Equipment

The Cincinnati Milling Machine Co., Cincinnati Grinders Incorporated	**F–3/Ci**
Stacor Equipment Co.	**F–3/St**
The Tolerton Company	**F–3/To**
Standard Pressed Steel Co.	F 28
Greenlee Tool Co., Division of Greenlee Bros. & Co.	F 29
The Lufkin Rule Co.	F 30
Millers Falls Company	F 31
Stanley Tools, Educational Department	F 32
The L. S. Starrett Company	F 33
Atlas Press Company	F 34, 35
Boice-Crane Company	F 36
Brown & Sharpe Mfg. Co.	F 37–40
Duro Metal Products Company	F 41
Cincinnati Lathe and Tool Co.	F 42, 43
The R. K. LeBlond Machine Tool Co.	F 44
Logan Engineering Company	F 45
Niagara Machine & Tool Works	F 46
Oliver Machinery Company	F 47
Powermatic Machine Co.	F 48
South Bend Lathe Works	F 49
Walker-Turner Division, Kearney & Trecker Corporation	F 50, 51
U. S.-Burke Machine Tool Div.	F 52
Electrikiln Division, The Harrop Ceramic Service Co.	F 53
Pereny Equipment Company	F 54
Kearney & Trecker Corporation	1211
Axelson Manufacturing Co., Division of U. S. Industries, Inc.	1212

4. Lockers and Locks

The Interior Steel Equipment Co.	F 55
Lyon Metal Products, Incorporated	F 56, 57
Fred Medart Products, Inc.	F 58, 59
Star Steel Equipment Co., Inc.	F 61
Dudley Lock Corporation	F 62
Master Lock Company	F 63
National Lock Company	F 64

American School Publishing Corp.	F 60





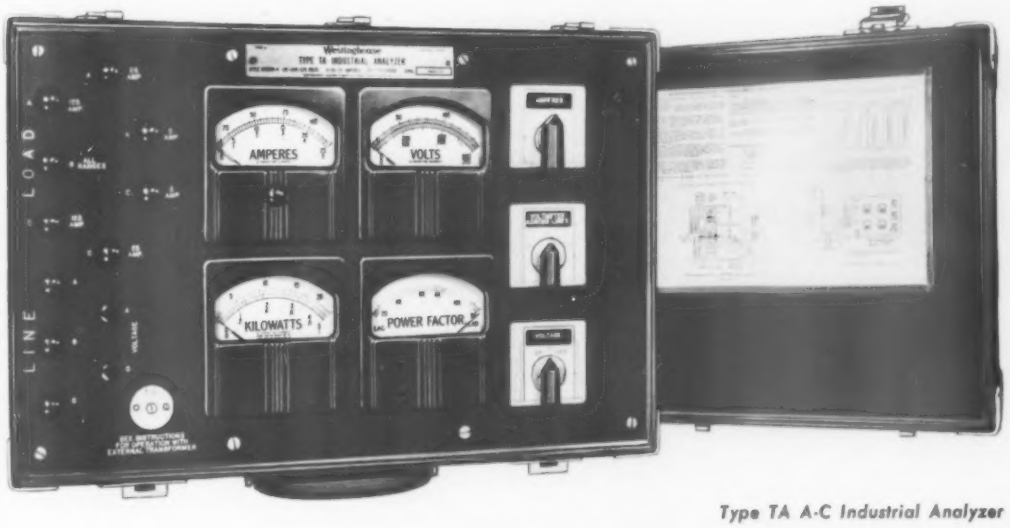
WESTINGHOUSE LABORATORY INSTRUMENTS

for college and university use

Westinghouse electrical instruments meet the exacting needs of university and college laboratories for scientific instruction . . . long life . . . accuracy . . . diversified application.

Illustrated and discussed here is a representative selection of electrical measuring instruments: portable, switchboard and panel types, recorders, shunts, resistors and portable transformers. For more detailed information and for recommended lists of instruments for various kinds of laboratories, call your nearest Westinghouse office or write for Catalog 190 and other literature, Westinghouse Electric Corp., P. O. Box 868, Pittsburgh 30, Pa.

ANALYZERS — type TA • accuracy: ammeter, voltmeter, 1%; wattmeter, 2%



Type TA A-C Industrial Analyzer

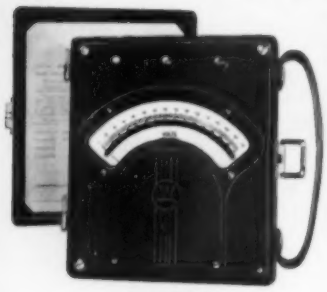
The Westinghouse Type TA Industrial Analyzer is for a-c circuits and measures volts, amperes, watts, and power factor. It incorporates in one compact, portable case all instruments, current transformers and voltage multipliers necessary to obtain complete operating data of alternating current circuits up to 600 volts, 125 amperes. It is self-contained, eliminating the need for carrying individual instruments and accessories to the job. Analyzer simply connects between power service and the apparatus under test. Switches permit shifting ammeter and voltmeter to check all lines of a three-phase circuit under load. Instruments are placed close together to permit accurate, almost simultaneous readings.

(For Complete Ordering Information, See Catalog Section 43-100)

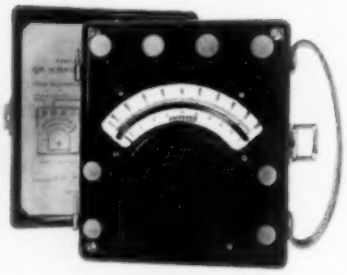
WESTINGHOUSE LABORATORY INSTRUMENTS

PORTABLE INSTRUMENTS

type P-5 line • accuracy ½%



Type PX-5
D-C Voltmeter



Type PA-5
A-C Ammeter

The Type P-5 Series of Westinghouse instruments can withstand the severe portable service of constant laboratory use, and still maintain the highest degree of accuracy over long periods of time. The combination of high-grade mirrored dials and knife-edge pointers eliminates parallax and assures accurate reading. *Scale length is* 5 inches, and divisions are arranged to aid quick reading. Maximum versatility is achieved with multi-range scale, some of which incorporate seven ranges. Stray magnetic fields do not impair accuracy. *Movements* are mounted on moulded face plate for quick, easy dismantling for inspection and study in the classroom or laboratory. *Pre-aged Moldarta case* does not warp or deteriorate from age, hard service or weather conditions.

full scale range of standard ratings

types PA-5 and PY-5 for a-c		type PX-5 for d-c	
AMMETERS	0-.5 to 0-200	AMMETERS	0-.05 to 0-50
MILLIAMMETERS	0-10 to 0-750	MILLIAMMETERS	0-.03 to 3,0000
VOLT-AMMETERS	0-75 to 0-750 volts 0-1 to 0-25 amps	MICROAMMETERS VOLT-AMMETERS	0-10 to 0-750 0-3 to 0-150 volts 0-0.3 to 0-30 amps
VOLTMETERS	0-3 to 0-750		
WATTMETERS	0-20 to 0-30,000	MILLIVOLTMETERS VOLTMETERS	0-2 to 0-2,000 0-1 to 0-1500

(For Complete Ordering Information, See Catalog Section 43-100)

type P-4 line • accuracy ¾%



Type PX-4
D-C Double-range
Voltmeter



Type PY-4
A-C Triple-range
Voltmeter

The Type P-4 Westinghouse line of portable instruments is designed for operating convenience. (Case measures only 4½"x 4½"x 2".) They may be easily dissembled for inspection and classroom instruction, and are well adapted for laboratory work. *Lightweight:* a-c instruments weigh only 2 pounds; d-c instruments, 3 to 4 pounds. *Moldarta Case* is lightweight, non-warping, weather-resisting.

full scale range of standard ratings

type PY-4 for a-c	type PX-4 for d-c (Also Radio-frequency and rectifier Types)			
AMMETERS	AMMETERS	0-.25 to 0-300	VOLTMETERS	0-1 to 0-750
0-1 to 0-50	Radio frequency	0-.5 to 0-20	Rectifier type	0-.5 to 0-150
MILLIAMMETERS	MILLIAMMETERS	0-1 to 0-3,000	MILLIVOLTMETERS	0-2 to 0-100
0-5 to 0-750	Radio frequency	0-75 to 0-800	VOLT-AMMETERS	0-1.5 to 0-150 volts
VOLTMETERS	Rectifier type	0-1.5 to 0-20		0-.15 to 0-60 amperes
0-1 to 0-750	MICROAMMETERS	0-25 to 0-1,000		
	Rectifier type	0-500		

(For Complete Ordering Information, See Catalog Section 43-100)

SWITCHBOARD INSTRUMENTS

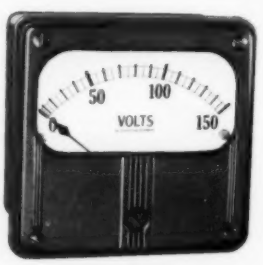
type 24 line • accuracy 1%



Type K-24 circular scale
D-C Ammeter

4½" Class — Circular Scale, Rectangular Front—Round-body Case for Flush Mounting. Because of its extra-long scale, the 24-Line instrument combines high readability with minimum panel space requirements, particularly useful where panel area is at a premium. The pointer travel gives a scale length more than twice as long as other types which require the same panel space.

type 25 line • accuracy 1%



Type K-25
flush-mounting
A-C Voltmeter

6" Class — Rectangular Case — Flush or Projection Mounting—Optional Internal Illumination. Westinghouse 25-Line instruments meet the requirements of many special installations. Simplicity of design, uniform appearance, interchangeability and availability of movements for any measurements, make this instrument especially suited for modernization as well as for new installations. All terminals are mounted near the vertical center line, permitting instruments to be mounted near the edge of a panel without interfering with supporting posts and wiring channels.

full scale range of standard ratings—24 and 25 lines

direct current	alternating current
Ammeters—0-1 to 0-50 (self-contained)	Ammeters (24 line)—0-1 to 0-20 (self-contained)
Ammeters for use with shunts—0-50 or 0-100 millivolts	(25 line)—0-1 to 0-50 (self-contained)
Voltmeters—0-2 to 0-800 (self-contained)	Ammeters for use with transformers—0-5
Milliammeters—0-1 to 0-500	Voltmeters (24 line)—0-150 to 0-600 (self-contained)
Wattmeters—120 or 240 volts, 0-50 or 0-100 millivolts for external shunts. (25 line only)	(25 line)—0-15 to 0-800 (self contained)
	Voltmeters for use with transformers—150
	Wattmeters for use with transformers—5 amperes—12 volts
	Synchroscopes—120 volts
	Power Factor meters—5 amperes, 120 volts, 0-1-0 scale
	Frequency meters (24 line)—120 volts, 60 cycles
	(25 line)—120 volts, 25 or 60 cycles

(For Complete Ordering Information, See Catalog Section 43-200)

for college and university use

type P-14 line • accuracy 1%



Type PX-14 open-face model. A separate binding post is provided for each range of a multi-range scale



Hinged cover, optional on either PX-14 or PA-14 models, assures full protection

The Type P-14 portable instrument includes the features of the larger portables, including magnetic shielding, plus the added advantages of extremely light weight and smaller overall dimensions. Its accuracy, versatility and low cost make it ideal for field and radio testing, and for general student laboratory work. *Maximum Versatility:* Up to 4 voltage ranges or 4 current ranges available with multi-range scales. Combinations such as three current and three voltage ranges in the same instrument make this one of the most versatile instruments available. *Maximum Portability:* Measuring only 5¼" x 4¼" x 2½", both the hinged cover type and the open-face model are small enough to fit a pocket. *High Overload Capacity:* Type P-14 instruments will withstand exceptionally high overload shocks.

full scale range of standard ratings

type PA-14 for alternating current		type PX-14 for direct current	
VOLTMETERS	0-1.5 to 0-750	VOLTMETERS	0-.75 to 0-800
AMMETERS	0-.5 to 0-50	MILLIVOLTMETERS	0-10 to 0-5,000
MILLIAMMETERS	0-5 to 0-500	AMMETERS	0-.5 to 0-50
Also available in rectifier and thermocouple types.		MILLIAMMETERS	0-1 to 0-2,000
		MICROAMMETERS	0-20 to 0-5,000

(For Complete Ordering Information, See Catalog Section 43-100)

type P-12 line • accuracy 2%



Type PA-12
A-C Voltmeter

The Type P-12 line includes single and multiple range ratings for complete D-C and A-C currents and voltage measurements. It meets all the performance requirements, including shielding, insulation, etc., required for 2% portable instrumentsin A.S.A. C39.1. Although it is the smallest and lowest cost of the Westinghouse portable instrument lines, it provides the same high degree of reliability, overload capacity and range coverage that are contained in the larger types.

Lightweight:
A-C instruments, weight from 1 to 1½ pounds
D-C instruments, weight from 1½ to 2 pounds

Pocket Size:
A-C — 4¼"x 3¼"x 2 1/16"
D-C — 4¼"x 3¼"x 1¾"

full scale range of standard ratings

type PA-12 for alternating current	type PX-12 for direct current
Self Contained Current—From 5 milliamperes to 50 amperes	Self Contained Current—From 20 microamperes to 50 amperes
Self Contained Voltage—From 1.5 volts to 300 volts	Self Contained Voltage—From 10 millivolts to 800 volts
Also available in rectifier types.	

(For Complete Ordering Information, See Catalog Section 43-100)

PANEL INSTRUMENTS

type 33 line • accuracy 1%



Type N-33
flush-mounting
wide flange

2½" Class — Scale Lengths, 1.5" to 1.8". ...ree flush mounting types of cases are available: the American War Standard; the ...ound, wide-flange instrument; the round, ...arrow-flange type; the rectanguiar type. Pro...tion mounted instruments also are available in round case. Cases are interchangeable.

type 35 line • accuracy 2%



Type N-35
flush-mounting

3½" Class — Scale Lengths, 2.06" to 2.4". Available as a complete line in five types of cases and mounting covering all laboratory, industry and radio applications. The ratings cover the broadest field consistent with prevailing requirements for instruments of this class. Cases are interchangeable without adapters.

type 37 line • accuracy 2%



Type N-37
flush-mounting

4½" Class — Scale Lengths, 2.8" to 3.2". The largest of the panel instruments. The self-contained ratings cover the broadest possible field for this class of instruments. Higher ratings may be obtained by using external resistors, shunts or transformers. Five types of cases are interchangeable throughout the line.

...ll scale range of standard ratings—types 33-35-37

...ct current	alternating current
...meters—0-1 to 0-50	Ammeters (for frequencies of 15 to 500 cycles)—0-1 to 0-50
...ammeters—0-1 to 0-800	Radio Frequency—0-1 to 0-20
...roammeters—0-20 to 0-800	Milliammeters (for frequencies of 15 to 500 cycles)—0.5 to 0-500
...meters—0-1 to 0-800	Rectifier—0-1 to 0-10
...voltmeters—0-10 to 0-500	Radio Frequency—0-10 to 0-800
	Microammeters—Rectifier—0-100 to 0-500
	Voltmeters (for frequencies of 25 to 125 cycles)—0-1.5 to 0-800
	Rectifier—0-3 to 0-300
	DB Meters—Rectifier—Standard Scales

(For Complete Ordering Information, See Catalog Section 43-300)

LABORATORY INSTRUMENTS

SOCKET INSTRUMENTS — type E line • accuracy 1%



Type E, showing simple but positive connection by plugs

Type E socket instruments provide a low cost means of checking load and machinery operation. One instrument can be used to check circuits at a number of places. Sockets may be mounted directly on conduits. After socket is installed, instruments may be plugged in or replaced quickly. Scale is 5¼", with bold figures and target pointers to make reading easy at a distance. Temporary overloads do not harm the movement; no short-circuiting connections are necessary.

(For Complete Information, See Catalog Section 43-600)

RECORDING INSTRUMENTS

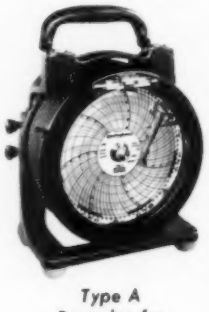


Type G-40 Recorder for Portable Service

TYPE G-40 DIRECT ACTING STRIP CHART RECORDER (Accuracy 1%)

Perfection of detail in chart drive, chart reroll, chart threading and inking system, makes Type G-40 Recorders easier to operate and has removed many causes of lost records. Available for switchboard or portable applications.

The chart and clock mechanism are readily removable without disturbing the instrument-movement or any connections to the instrument. Recording pen has a long-wearing, platinum-iridium point. Chart has double perforations for positive traction on driving drum. Accurate synchronous motor clock, furnishes drive power for chart. Chart speeds of ¾", 1½", 3" or 6" per hour or per minute.



Type A Recorder for portable mounting

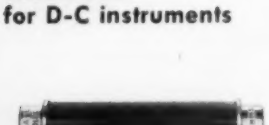
TYPE A ROUND CHART RECORDER (Accuracy 2%)

A low first-cost, low-maintenance instrument for a variety of applications where chart records of 2% accuracy are adequate for their purpose. Extra-sturdy construction makes this a convenient instrument for miscellaneous jobs. Portable, switchboard mounting, wall mounting or detachable socket-mounting cases are available. Scale length is 2 inches, but voltmeter charts have suppressed zero scale with divisions comparable in size and readability to those of much longer scales. Charts are available for 24 hour, 3 day or 7 day operation. High-grade paper used makes charts stay flat.

(For Complete Ordering Information, See Catalog Section 43-400)

AUXILIARY EQUIPMENT

SECTIONAL TUBULAR RESISTORS for D-C instruments



The sectional construction of these resistors permits a wide range of accurate measurements of high voltages with one milliampere instruments. Resistance values ¼, ½, ¾ or 1 megohm are standard, and combinations of these are used to form the complete unit. They are designed for panel mounting or portable use.

TYPE G AND GG SHUNTS for D-C Measurement



Type G and GG shunts provide a complete line for use with indicating or recording instruments for measuring direct currents beyond the range of self-contained instruments. Accuracy is maintained by special manganin alloy strips which are unaffected by temperature. Portable and switchboard types are available in 50 and 100 millivolt sizes with many different current ratings.

PORTABLE POTENTIAL AND CURRENT TRANSFORMERS



For measuring electrical quantities greater than the self-contained ranges for which the instruments are rated, these portable pontential and current transformers offer a convenient and accurate means of increasing instrument usefulness. High overload capacity of multiple ration current transformers permit safe use of continuous loads up to 200%. Potential transformers, available with three primary ratings, can be loaded safely up to several hundred percent.

TYPE A-80 NONSPARKING A-C TACHOMETER



Type A-80 tachometer combines an induction type generator and a rectifier indicating instrument. It has no commutator and no brushes. Sealed-in-type bearings which require no lubrication for life, practically eliminates maintenance and assure trouble-free performance.

(For Complete Ordering Information, See Catalog Section 43-800)

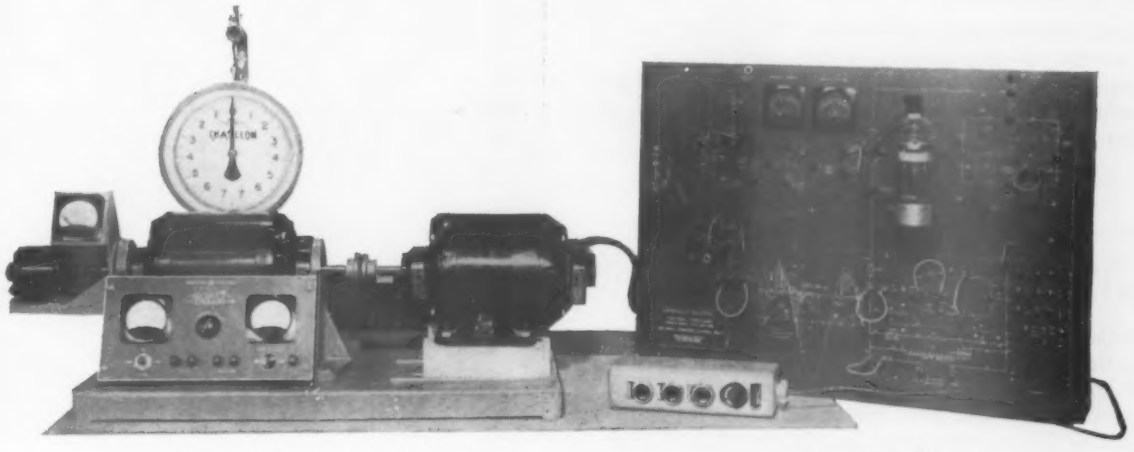
WESTINGHOUSE ELECTRIC CORPORATION
P. O. BOX 868 **PITTSBURGH 30, PA.**
B-5938-C
Printed in U.S.A.

GENERAL ELECTRIC COMPANY

Apparatus Sales Division

1 River Road, Schenectady 5, N. Y.

EXPERIENCE in the school laboratory, working with a carefully selected group of well-designed equipment, is invaluable to the student preparing for a career. To assist in this educational process of learning by doing, General Electric offers special equipment for electrical laboratories – equipment developed with the co-operation of many well-qualified educators.



Dynamometer

Thy-mo-trol drive

Fractional-horsepower Dynamometer

Above at the left is a machine designed to aid in analyzing and demonstrating fractional-hp motors, generators, and dynamometers. The dynamometer is rated 115 volts d-c, ¾ hp at 2500 rpm. It is a separately excited (115 volts, d-c) machine, with a 1 hp generator absorption rating and has a maximum speed of 4000 rpm. It is of particular value in obtaining performance curves and checking power requirements of small motors, internal-combustion engines, and the like. The dynamometer has a sealed-ball-bearing cradle mount and is equipped with a 10-in. 7.5-0-7.5-lb scale.

On the left-end shaft is mounted a small tachometer generator and speed indicator. The right-end shaft is for attaching a motor to be tested. In the above illustration, this is a motor controlled by the Thy-mo-trol® panel shown at the right.

This dynamometer has great value in a vocational or technical school, and its low cost affords more students the opportunity to study the characteristics of small motors, etc. Full information is given in Bulletin GEC-835.

Half-wave Thy-mo-trol Drive

This G-E half-wave, ½-hp educational Thy-mo-trol drive kit helps make students familiar with the fundamentals of half-wave electronic motor control as used in industry. This special educational kit utilizes the same components and basic circuit principles of the commercial half-wave unit.

The educational Thy-mo-trol drive is a high-grade "breadboard" unit using a dark Textolite® plastic panel furnished in kit form. The school receives all components, including the wire to assemble the unit. The circuit diagram is molded in white in the face of the panel, while actual wiring and all components, except tubes, are to be attached to the back of the panel. All important circuit points are brought out to the front "banana-plug" jacks.

The motor and control station are completely assembled and include attached control cables arranged to plug into the panel. Full information is given in Bulletin GEC-674.

Amplidyne Control and Servo-mechanism Kit



Contributing greatly to the accuracy, speed of response, and flexibility of control and regulating systems, the am-

®Registered trade-mark of General Electric Company.

plidyne is an important tool in modern industry. For this reason, practically every technical institution includes instruction on the fundamentals of the amplidyne in its curricula.

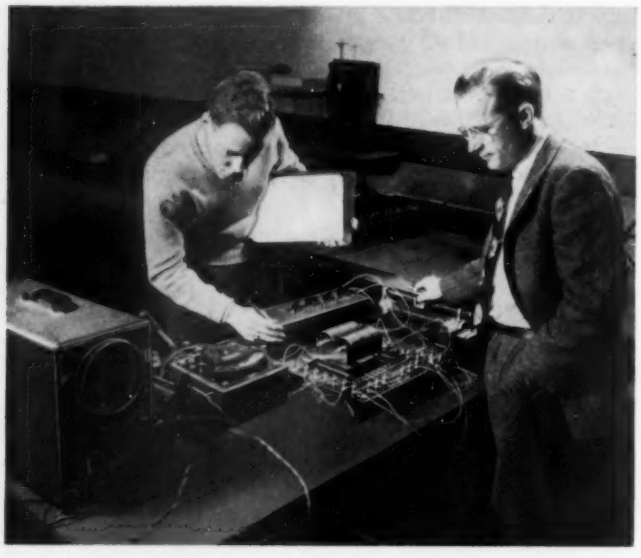
The G-E amplidyne control and servo-mechanism kit shown here and plugged into a service unit, includes a 1500-watt special educational amplidyne motor-generator set with seven control fields. Leads are brought out to spring terminals.

Additional co-ordinated accessories, including transformers, selsyns, electronic tubes, and a small gear-motor are provided to permit the amplidyne and its accessories to be connected and operated as an amplidyne control and servo-mechanism system.

Amplistat

The magnetic-amplifier principle is finding broad applications in the electrical field today, and technical institutions will find this G-E educational amplistat a valuable aid in demonstrating this principle to students. It is also useful for experimental purposes in school and industrial laboratories and can be used in conjunction with electronic equipment, or, in some cases, it can replace electronic equipment.

This amplistat shown has a high power gain up to 25,000 watts per watt with output of 1 amp continuous or 4.0 amp for 2 minutes and operates from the 115-volt,



60-cycle line. Multiple input coils make it a flexible unit, easily adaptable to many types of circuits. Either high or low input impedance is possible. The device is easy to demonstrate and has a schematic diagram molded into the panel face.

Rectifier Transformer Bank



More than 150 voltage combinations can be obtained with the G-E rectifier transformer

These transformers are especially designed for industrial electronics work in school laboratories. The multiplicity of separate windings and both primary and secondary taps provides for comprehensive laboratory experience with many types of rectifier circuits and many other tests. There are obviously many other laboratory uses for insulated transformers with a wide choice of input and output voltages, as indicated in the connection diagrams shown below.

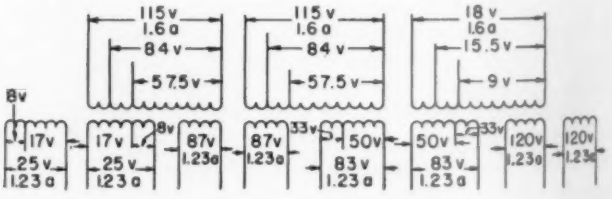


Diagram of connections, rectifier transformer, Cat. No. 78G799

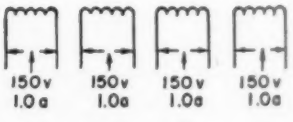
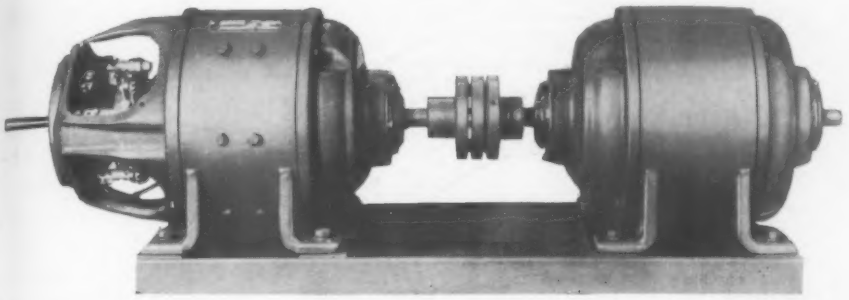


Diagram of connections, interphase transformer, Cat. No. 77G820

A-c-D-c Motor-generator Sets

These represent a selection of motor-generator sets especially appropriate for technical and vocational high schools. Information on other sets will be furnished gladly on request.



Four-speed, induction-motor drive. Approximately 47 in. long, 19 in. wide, 17 in. high

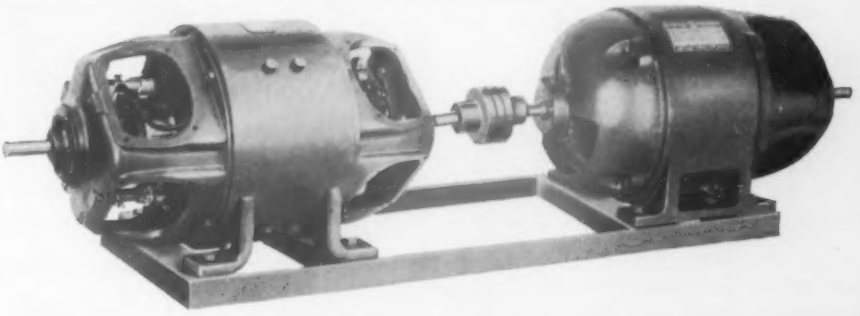
Squirrel-cage A-c Motor	220 or 208 volts, 3-phase, 60 cycles 4 speeds, 2 windings				
	Hp	3	2	1½	1
	Synchronous Speed, Rpm	1800	1200	900	600
D-C Generator	1½ kw, 1750 rpm; flat-compound wound with 2 armature, 2 shunt-field, and 2 series-field leads.				

Typical Experiments:

(a) Use d-c generator as a load to take data on typical comparative operating characteristics of induction motors at 600, 900, 1200, and 1800 rpm.

(b) Plot four points on a no-load saturation curve of a d-c generator.

With d-c exploring-coil. Approximately 48 in. long, 18 in. wide, 14 in. high

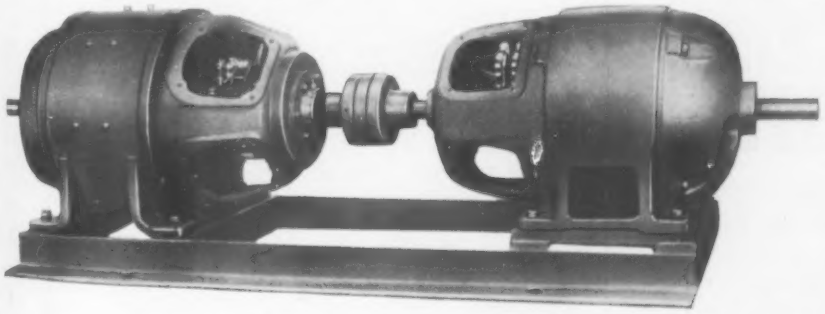


Typical Experiments:

(a) Use d-c generator as a load to take typical operating test data on wound-rotor motor over its 2:1 speed range.

(b) Connect oscillograph to exploring-coil collector rings and observe evidence of flux pattern of generator, no-load to full-load, half speed to full speed, and with different brush settings.

Wound-rotor A-c Motor	3 hp, 220 or 208 volts, 1800 rpm 3-phase, 60 cycles
D-c Generator	1½ kw, 1750 rpm, 115 volts, shunt and compound wound. Equipped with 16-turn exploring-coil with leads brought out to collector rings for oscilloscope.



The d-c machine has heavy series winding with 35% tap to provide for heavily over compounded and essentially normally compound operation. Approximately 56 in. long, 19 in. wide, 17 in. high.

Synchronous Machine	As an Alternator	As a Motor
	5 kva, 120/240 volts, 1-, 3-, or 6-phase, 60 cycles, 0.8 PF, 4 kw at 3-phase, 60 cycles, 1800 rpm	7½ hp, 1.0 PF, 3-phase, 60 cycles
D-c Machine	As a Generator	As a Motor
	5 kw, 125 or 250 volts	5 hp, 115 or 230 volts

Typical Experiments:

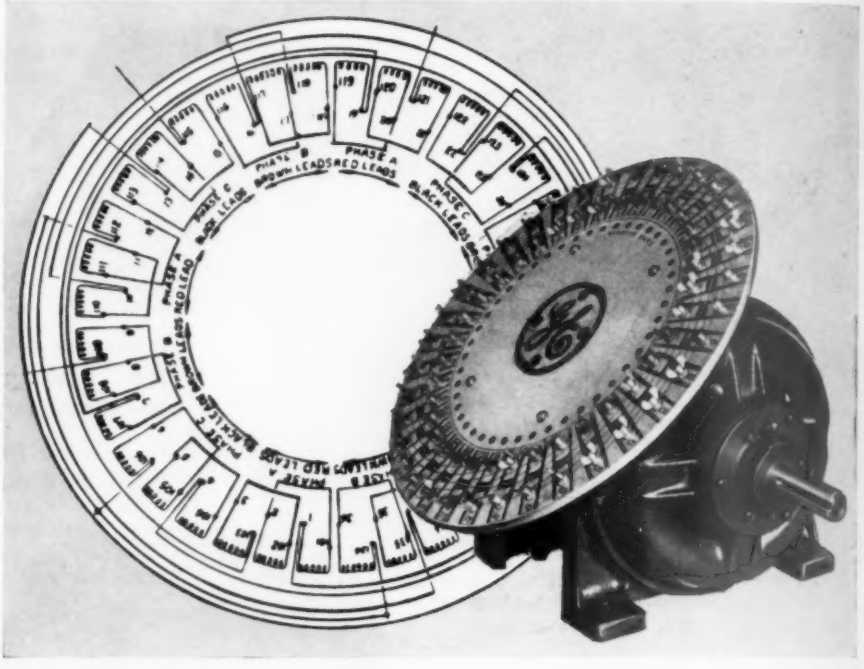
(a) Load and no-load saturation curves.
(b) Voltage-regulation curves for shunt and compound generators.
(c) Speed-regulation curves for shunt and compound motors.
(d) Synchronizing of alternators.
(e) Parallel operation of machines.

Two-hp 72-terminal Induction Motor

Theory and Application Combined

• • •

The Study of Induction-motor Circuits Is Speeded with This 72-terminal Induction Motor



This 36-coil, 72-terminal induction motor is an excellent unit to assist the student in his study of induction-motor design and the study of circuits in relation to speed, phase, and power. This motor enables the student to combine his theoretical work with actual practice in selecting circuits for the different available combinations of phase and speed and then testing these motors for comparative torque, horsepower output, efficiency, power factor, and other tests.

The construction of the motor enables the student to do this work with the minimum of time. The 36 coils are in place, with their 72 leads permanently connected to wing-nut terminals on the specially designed circular connection board assembled to the motor frame as illustrated.

To further illustrate the fundamentals of the squirrel-cage motor, the number and relative position of rotor bars with respect to stator coils is indicated on the connection board. A set of color-coded leads is included to assist the student in tracing his connections.

Many ratings are possible with the G-E 72-terminal induction motor. It is actually ten or more motors in one at the student's disposal, since the unit can be wired for ten different combinations of phase, voltage, and number of poles.



On request, we will gladly send you a copy of this 16-page bulletin, GEA-5526, containing information on other specially designed G-E Educational Equipment for electrical laboratories. General Electric Company, Apparatus Sales Division, Schenectady 5, N. Y.

New High-accuracy Portable Instruments

High Accuracy. The new G-E Type DP-12 portable instruments feature accuracy of ¼ of 1 per cent of full scale. For less-critical applications, new Type DP-11 instruments have an accuracy of ½ of 1 per cent of full scale. Voltmeters, millivoltmeters, ammeters, milliammeters, and microammeters are available in a wide range of ratings.

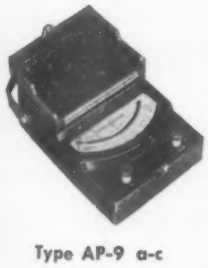
Sturdy Construction. Spring-mounted jewel bearings provide maximum protection against damage from shock. Strong, break-resistant, extra-heavy Textolite* case encloses all instruments.

Better Scale Illumination. New molded window affords best lighting of the instrument's large 5½-inch wide-open scale for fast, correct readings.



Improved Terminals. Terminals are located at the rear of the instrument, away from the operator. This arrangement affords convenient and safer operation. New design accommodates a greater variety of connecting leads.

Medium-size Portable Instruments, Types AP-9 (A-c) and DP-9 (D-c)



Type AP-9 a-c voltmeter

These sturdy, compact G-E instruments are useful for general laboratory work. Their reliable movements are well-damped, effectively shielded, and housed in dust-tight molded cases. Separate binding posts for each range reduce the danger of overloading. These instruments are available in single, double, or triple ranges of voltmeters, ammeters, volt-ammeters, volt-wattmeters, and single-phase wattmeters.

Small Panel Instruments

These reliable G-E panel instruments are styled for quick and accurate reading. When mounted in 45-degree stands, they are well-suited for school-laboratory test-bench use. Other models are available in rectifier and thermocouple construction and in 1⅛-, 2½-, and 4½-inch sizes.



Type DO-71 3½-inch instrument in 45-degree stand

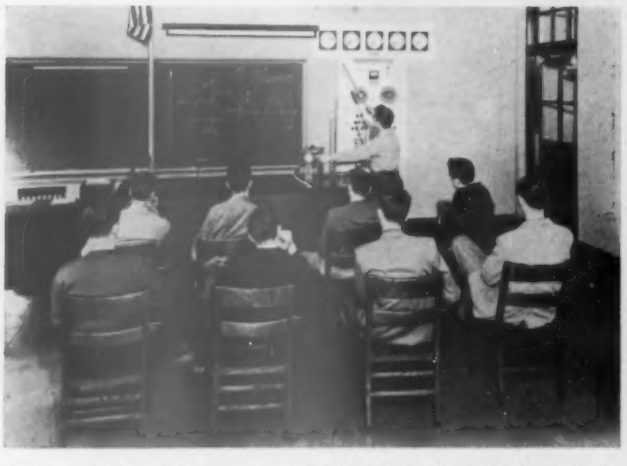
*Reg. trade-mark of General Electric Company.

Lecture-room Instruments with 14.2-in. Scales

The shadow-proof dial of these new G-E instruments makes them ideal for lecture-room demonstrations. The convex glass cover affords maximum visibility. The scale surface is flush with the case front. The scale is easier to read and the case is both dustproof and moisture-resistant.

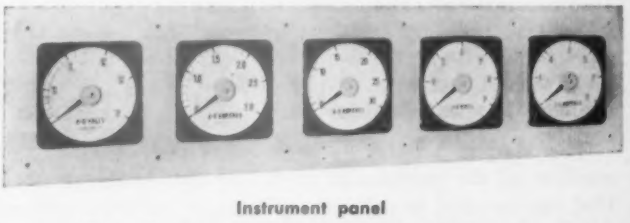
Type AB-16 a-c instruments and DB-16 d-c instruments are 8¾ inches square. Their *14.2-in. scale* makes them exceptionally easy to read. All have 1 per cent accuracy. Available as a-c and d-c voltmeters and ammeters, wattmeters, synchroscope and power-factor meters, a-c temperature meters, and frequency meters.





Control panel and instruments should be located at the front of the room, as illustrated

Photo: Courtesy of the Bell Vocational School, Washington, D.C.



Instrument panel

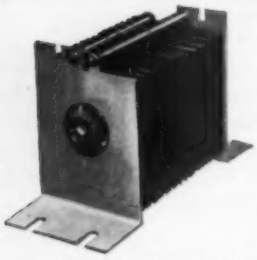
Photo: Courtesy of the Standard Electric Time Company

These G-E instruments include the following:

0-30-150 volts, a-c — 0-30 amp, a-c — 0-30-150 volts, d-c
0-3 amp, a-c — 0-3-30 amp, d-c

Calibrated leads connect to terminal receptacles on the control panel.

Metallic Rectifiers



Typical metallic-rectifier stack

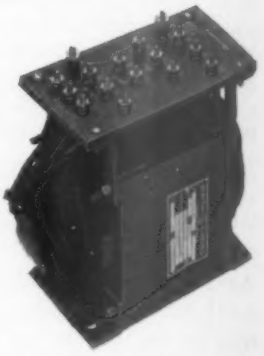
Copper-oxide, germanium, and selenium-rectifier stacks provide an efficient and economical means for converting a-c into d-c for many laboratory purposes. These stacks are available in a wide range of ratings, and rectifiers of virtually any desired voltage and current for normal laboratory use can be assembled from the various-sized cells.

Transformer Construction Kit for Electronics Circuits

This transformer construction kit is designed to give the student a basic understanding of the function as well as the practical application of transformers in electronics circuits.

The unit, Cat. No. 79G867, is rated 0.978 kva, 60 cycles intermittent duty, primary 115/230 volts with secondary voltages 230/172.5/115, 115/center tap, 2.5, 5/center tap.

This same transformer is also available as a factory-assembled unit, Cat. No. 79G767.



G-E transformer after assembly

Motor and Generator Construction Kits



Building standard commercial motors gives students actual experience with motor design.

Motor Design Easily Understood

• • • •

Students "Learn by Doing" with Versatile G-E Motor Construction Kits

General Electric fractional-horsepower motor and generator construction kits provide valuable experience for the student in building standard units of high quality from commercial production-line parts. Each kit of parts is complete except for wire and varnish which are normally available in school laboratories.

The student winds the coils, tests the windings, assembles all the mechanical parts and thus builds a motor that can be used to drive many home or school machines. All mechanical parts are furnished fully machined, thus greatly reducing the time needed to complete the motor, and permitting the student to concentrate on the electrical work and principles involved. Pressing the bearings on the shaft and drilling nameplate holes are the only mechanical operations involved.

Ratings

Construction kits are available in the following ratings:

Cat. No.	Rating	Rpm	Voltage	Frequency Cycles	No. of Phases	Type & Frame	Type of Unit
367X82	¼ hp	1725	115	60	Single	KC47	Capacitor-type
367X83	½ hp	1725	115/230	60	Single	KC65	Capacitor-type
367X84	½ hp	1725	220	60	Three	K63	Squirrel-cage
327X4	300 watts	1725	125	D-c	.....	BC66	Compound-wound

Laboratory Instruction Books

Laboratory-type instruction books are available for the purchasers of these kits. These instructions give a careful step-by-step outline of both the electrical and mechanical assembly work to be done, with well-chosen diagrams and photographs. A good student should be able to follow the instructions and build a successful motor or generator with only nominal supervision from his instructor. A copy of the applicable instruction book is shipped with each kit.

FOR MORE EFFECTIVE TEACHING –

G-E TALKING SLIDEFILM COURSES

U. S. Army studies show that students taught with visual aids learn 35% faster, remember 55% longer. For training programs in schools, colleges, businesses, industries, unions, and utility companies, General Electric offers two outstanding slidefilm courses: the Electronics Course, designed to give a practical and thorough understanding of the fundamentals of electronics and its applications in modern industry; and the Motor Selection and Application Course, a complete program which simplifies the complex task of educating and training personnel in the selection and application of motors.

Electronics Course



This course is excellent for fundamental instruction or review for advanced physics, electrical, and other technical students anxious to take their places in the growing world of Industrial Electronics. Every sequence of the twelve-part course has been tested on groups of widely different educational levels. Educators and plant executives alike have praised its combination of easy understanding and technical accuracy.

The course covers the following subjects:

1. Harnessing the Electron
2. Electronic Tubes as Rectifiers
3. Grid Control of Electronic Tubes
4. Fundamentals of Electricity, Part I
5. Fundamentals of Electricity, Part II
6. Electronic Relay Systems
7. Electronic Rectifier Equipment
8. Thy-mo-trol (Thyratron Motor Control)
9. Electronic Control of A-c Power
10. Electronic Frequency Changing
11. Photoelectric Systems
12. Electronics, Today and Tomorrow

Here's what you get in one complete package:

12 *Slidefilms and Recorded Talks*—each about ¾ hour long.

Review Booklets—10 sets of 12 individual lessons, keyed to slidefilms.

1 *Instructor's Manual*—a 146-page book with hundreds of illustrations and detailed instructions for organizing the meetings and handling group discussions.

1 *Carrying Case*—attractive and strongly built, it holds records, films, and manuals.

The price of the complete package is $150. Extra manuals, $3 each; extra sets of the 12 review booklets, $3 each.

Motor Selection and Application Course

This ten-lesson course shows simply but clearly how motors operate, what types are in use today, and how to select and apply the right motor and control for different jobs.

These important subjects are covered by the course:



1. Fundamentals of Motors
2. Types of Motors
3. Fundamentals of Motor Selection
4. Selection & Application of A-c Polyphase Induction Motors
5. Selection & Application of A-c Single-phase Integral-hp Motors
6. Selection & Application of D-c Motors
7. Selection & Application of Synchronous Motors
8. Selection & Application of Adjustable-speed Drives
9. Selection & Application of Gear-motors
10. Selection & Application of Fractional-hp Motors

The complete kit includes:

10 *Sound Slidefilms* (35-mm film slides and 16-inch, 33⅓-rpm records) running 15 to 30 minutes each.

1 *Instructor's Manual*, giving detailed instructions on how to organize and present meetings, handle group discussions, and assure a practical understanding of the material presented.

Review Booklets—10 copies of the ten-booklet set.

1 *Carrying Case*

Prices—For the complete kit, $100. Extra instructor's manuals, $1.50 each; extra sets of the ten review booklets, $1.50 each.

Orders for these courses can be placed through any local G-E office, or write to General Electric Company, Section 640-423, Schenectady 5, New York.

AMERICAN OPTICAL COMPANY

Buffalo 15, N. Y.

Branch Offices

New York, Chicago, San Francisco, Washington, Boston, Los Angeles, Detroit, Dallas, Columbus, St. Louis, Toronto, Philadelphia, Atlanta, Minneapolis

SCIENTIFIC INSTRUMENTS

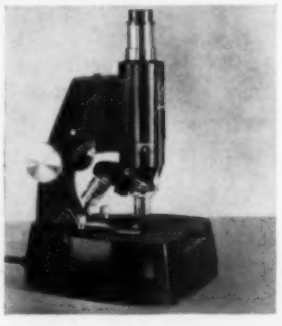
MICROSCOPE NO. 735

This high quality, functional microscope was designed to simplify student teaching. It has a single spring-loaded coarse-fine speed focusing adjustment, which provides sensitive focusing and protects slides against damage. All metal construction of the slideways and other working parts assure years of trouble-free service. 10X and 43X achromatically corrected objectives, color anodized for easy identification, with a locked-in 10X eyepiece form crisp, clear images. Available with or without an attached illuminator, this modern microscope designed at the suggestion of science educators is gaining popularity as the most versatile and easy-to-use microscope for teaching purposes.



AO SCHOLAR'S MICROSCOPE NO. 78B

Designed to fit student needs and to meet teaching requirements. Built-in light source enables even novices to achieve excellent results. Entire microscope is low for comfortable posture, reverse position of arm and dual cone nosepiece provides clear view of stage and controls. A single gear train adjustment provides rapid, critical focusing. 10X, 43X achromatic objectives, 10X Huygenian eyepiece and stage clips are locked in place.



MICROSCOPE NO. 35MH

A versatile instrument for medical and university laboratory work. Features include rack and pinion coarse and graduated micrometer screw-type fine adjustments, 125 mm square bakelite stage with built-on ungraduated "pinch-grip" mechanical stage, fork type focusing substage mount, N.A. 1.25 condenser, dual cone triple revolving nosepiece, 10X, 43X and 97X, achromatic objectives, 5X and 10X Huygenian eyepieces.



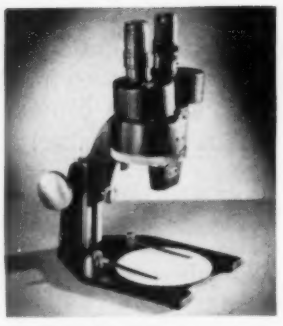
MICROSCOPE NO. 15MLH

A fine binocular instrument for more critical and extended observation. Binocular body eye-tubes incline 30° for comfortable posture and converge at 8°. Features include rack and pinion coarse and graduated micrometer-screw type fine adjustments, 125 mm square bakelite stage with built-on "pinch-grip" mechanical stage, fork-type focusable substage mount with N.A. 1.25 condenser, dual-cone revolving triple nosepiece, 10X, 43X and 97X achromatic objectives, 5X and 10X Huygenian eyepieces.



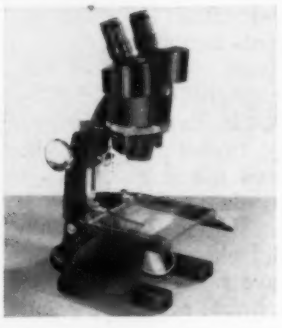
MICROSCOPE NO. 21X

A Stereoscopic Microscope of highest quality at a moderate price. Provides stereoscopic vision, an image that is upright and a wide field of view. Valuable for examining flowers, plants, insects, molds, minerals. Equipment includes: platen-type stage, double revolving nosepiece with 1.0X and 2.0X paired achromatic objectives, 9X paired wide field eyepieces.



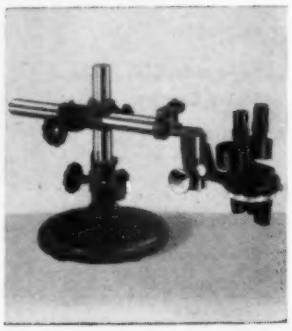
MICROSCOPE NO. 25LF

This Stereoscopic Microscope has a square glass stage, removable horse shoe base and mirror for use with transmitted light, triple revolving nosepiece with 1.0X, 2.0X, 3.0X paired achromatic objectives and 9X and 12X paired wide field eyepieces Other models offer a wide selection o optical and mechanical equipment



MICROSCOPE NO. 23

A Stereoscopic Microscope for examining large objects not conveniently placed on a microscope stage. Ring and swivel mounting of binocular body permits rotation to most convenient position for observation. Elevation device and arm extension permit inspection of large surface areas and objects in a deep dish. A wide range of optics can be supplied.



MICROSCOPE NO. P45

A simplified polarizing microscope priced within reach of educational budgets, for teaching chemical microscopy, petrography and crystallography. Features include use in reversed position, low height, gear train focusing, built-in light source, Polaroid polarizer and analyzer, graduated revolving metal stage, AO strain-free optics. Body tube accommodates AO compensators, choice of revolving nosepieces.



AMERICAN OPTICAL COMPANY

AMERICAN OPTICAL COMPANY

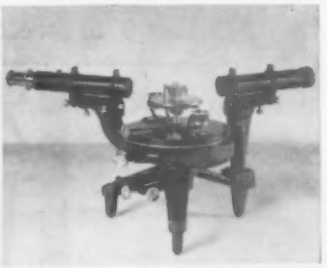
AO LABORATORY ILLUMINATOR NO. 710

An economical double-duty illuminator, providing ample light for as many as four microscopes, and for laboratory table work as well. Features a 150 watt, 120 volt clear daylight lamp and an opal glass globe, both inexpensive replacement parts. Supplied with 7 feet of Underwriters' approved cord and plug. Base and shade finished in alcohol-resistant enamel.



DIVIDED CIRCLE SPECTROMETER NO. 10025

Designed for teaching basic optical concepts. Measurements of prism angles, refractive index, dispersion, and wave length can be done with precision. Accessories include a comparison prism for observing two spectra simultaneously, a camera attachment, a choice of three glass prisms, and a hollow prism for use with liquids.



MICROSCOPE ILLUMINATOR NO. 385

A simple, compact illuminator with 10 watt lamp giving ample illumination for most work. For use with or without microscope substage mirror. Sturdy bakelite construction with a bracket adapter, it can be attached to the No. 73, No. 15 and No. 35 Laboratory Microscopes.



PHOTOMICROGRAPHIC CAMERA NO. 662

An important and necessary laboratory tool for photomicrographic work. Sturdy shock absorbed metal base securely clamps microscope and light source in any of three positions. Vertical pillar supports adjustable camera arm, special light tight adapter enables camera arm to be swung in or out of optical path, both 35 mm and 4" x 5" camera backs available, each rotates through 360° eliminating need for revolving stage. Supplied with telescopic eyepiece.



MICROSCOPE ILLUMINATOR NO. 349

A compact, powerful light source with variable transformer, for low power inspection, physics experiments, general "spot" illumination. Available with jack-knife standard and base, optical base attachment and adapter rod for ring stand.



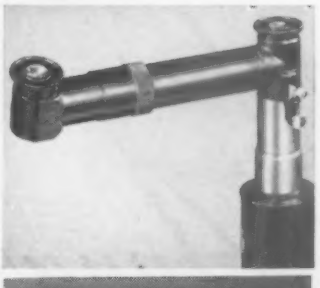
NO. 900 MICROTOME

A table type microtome for the school laboratory with precise hand operated feed. Sections from 5 to 500 microns can be cut with razor or microtome knife. 3¼" long glass travelways securely support knife beyond the length of cut. Object clamp accommodates mounted specimens up to 1⅛".



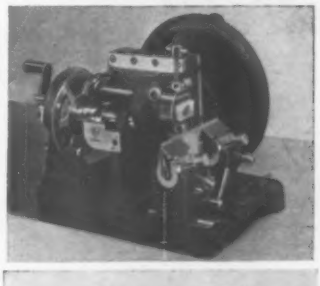
DEMONSTRATION EYEPIECE NO. 434

Replaces the standard microscope eyepiece with widely separated eyepieces through which two persons can view the same field at the same time. Valuable for quizzes and study. A movable pointer is visible in both eyepieces.



MICROTOME NO. 815

A moderately priced instrument with the unique AO Spencer feed mechanism which is independent of the vertical movement. Provides greater feed accuracy and protection from shock. Feeds sections 2 to 40 microns in thickness. Total excursion is 22 mm. Ball and flange type object clamp. Rigid knife holder with adjustable cutting angle.



MICROSCOPE ILLUMINATOR NO. 735

A modern light source with 100 watt lamp, convenient external adjustments for binocular microscopes, bright field, dark field and phase. It is recommended for photomicrography and microprojection. Features rack and pinion focusing, precise tilting, simple reflector adjustment, cool operation, iris diaphragm, and single or multiple filter holders.



MICROTOME NO. 820

The outstanding instrument for critical serial sectioning. Massive and rigidly built. Feed mechanism is independent of vertical movement. Critical setting for thicknesses from one to fifty microns. Total excursion of feed is 28 mm. Ball and flange type object clamp. Double clamp knife holder with wide range of cutting angles.



MAGNIFIERS

Finest quality precision magnifiers in folding chromium plated cases for pocket use. Triple aplanats (three cemented lenses) or doublets (two lenses) in powers of 6X, 10X, or 12X. Utility magnifier with horse shoe base has a 36 mm, 4.5X, 3 lens system in threaded focusing mount.



INSTRUMENT DIVISION • BUFFALO 15, NEW YORK

KLETT MANUFACTURING CO.

179 East 87th Street, New York 28, N. Y.

KLETT



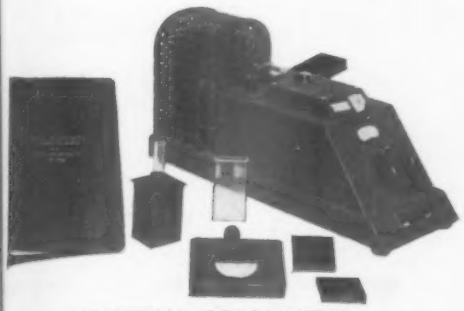
Electrophoresis Apparatus

FOR THE ANALYSIS OF COMPLEX COLLOID SYSTEMS, AND FOR THE CONTROL OF PRODUCTION OF PURIFIED PROTEINS, ENZYMES AND HORMONES

Complete apparatus for various types of electrophoretic analyses. Concentrations of individual components of multicomponent systems can be measured by means of several different systems of recording.

The accessories include conductivity bridge, and cells for measuring diffusion coefficients, for index of refraction, and for separation of large amounts of substances.

Klett-Summerson



INDUSTRIAL COLORIMETER

PHOTOELECTRIC COLORIMETERS



CLINICAL COLORIMETER

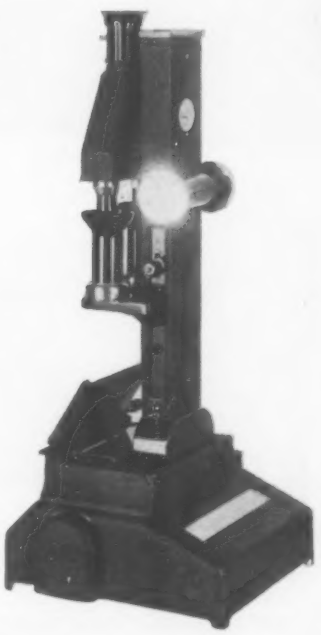
The Klett-Summerson photoelectric colorimeters are easily operated filter photometers. The scale readings of the potentiometer are proportional to the concentration of the colored substance in the cuvette when Beer's Law holds. The balanced two-photocell construction permits operation on unstabilized A.C.-D.C. circuits.

The Industrial model can use either the cylindrical cuvette or a 2 to 4 cm deep rectangular cuvette for measurement of solutions with very pale colors.

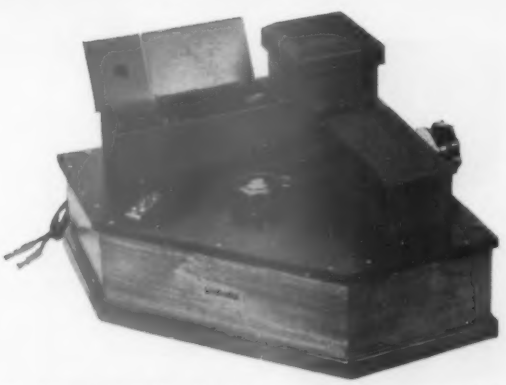
The Clinical model requires a sample of 1 to 5 ml for its cylindrical cuvette.

THE KLETT BIO-COLORIMETERS

A cup and plunger colorimeter for direct visual comparison of unknown with a standard solution. The glass scale and vernier are read from the top. No filters are used.



The Klett Fluorimeter



Designed specifically for measuring very small amounts of fluorescing substances such as: vitamins, blood pigments, chlorophylls, carcinogenic hydrocarbons, many other substances.

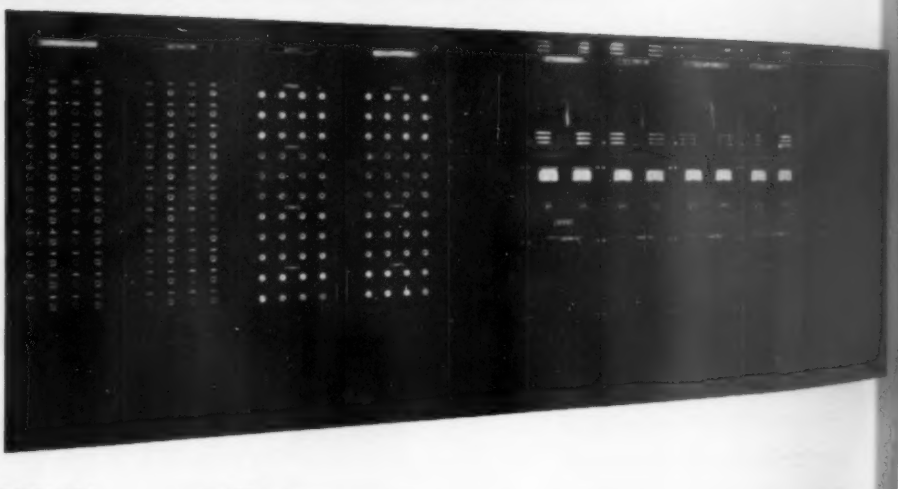
FEDERAL PACIFIC ELECTRIC PRODUCTS CO.

Main Office: 50 Paris Street, Newark 1, N. J.

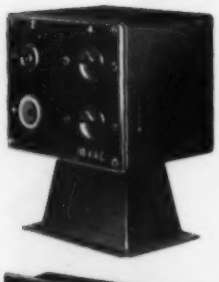
MAIN SWITCHBOARDS AND SUB-SWITCHBOARDS FOR CHEMISTRY AND PHYSICS LABORATORIES



FEDERAL PACIFIC® Switching and Control Equipment is designed to facilitate scientific research and experimental work in schools and colleges. Electrical energy is extended from the Main Switchboard to classrooms, tables and laboratories.



A typical large main switchboard for Chemistry, Physics, Research and Scientific Laboratories. All types and sizes are available to meet the exact requirements of every installation and provide ready adaptability for future changes and expansion.





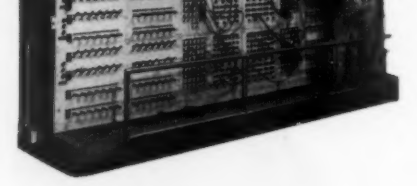


SERVICE OUTLETS

Enclosed service outlets for pedestal mounting at tables can be provided with any combination of equipment in either single or double face arrangements.

Flush type service outlets in all types of combinations have recess box of code gauge steel for mounting in tables, desks or walls.

Cord Sets, color coded, supplied with male and female plugs — spade plugs or pin plugs.



Federal Pacific Light Control Switchboards for school auditoriums can be furnished to control any required number of lighting circuits, any one or any group of which can be connected to the desired dimmers. Switches are of the silent-acting type . . . switchboards are totally dead front for safe operation.

For full information about Federal Noark Motor Starters, Contactors, Pushbutton Stations, Safety Switches, Panelboards, Circuit Breakers, Power and Light Distribution Switchboards, Auditorium and Stage Lighting Switchboards, etc., write Federal Pacific Electric Company, 50 Paris St., Newark 1, N. J.

Weston Electrical Instrument Corporation

Manufacturers of Weston and TAG Instruments

578 Frelinghuysen Avenue, Newark 5, N. J.

WESTON INSTRUMENTS

The Standard for

INSTRUCTION · RESEARCH · INDUSTRY

From the simplest galvanometer to instruments of the laboratory standard classification, WESTON instruments are the accepted standards of science and industry the world over. As such, they logically are widely preferred for all requirements in the classroom, laboratory or shop.

The WESTON instruments illustrated on the following pages are especially suitable for educational use and can be supplied in all practical ranges. Literature on the complete line can be secured from your local WESTON representative, or direct.

Laboratory Instruments

Voltmeters, Ammeters, Wattmeters, Standard Cells, Precision Shunts.

Portable Instruments

Voltmeters, Volt-Ammeters, Millivoltmeters, Volt-Millivoltmeters, Ammeters, Microammeters, Milliammeters, Microfarad Meters, Ohmmeters, Galvanometers, Power Factor Meters, Phase Angle Meters, Wattmeters, Frequency Meters, Electrolysis Instruments.

Panel & Switchboard Instruments

Voltmeters, Ammeters, Milliammeters, Microammeters, Wattmeters, Galvanometers, Frequency Meters, VU and DB Meters, Elapsed Time Indicators, Ruggedized Instruments, VAR-meters, Power Factor Meters, Synchroscopes, Transformers, Mounting Bases.

Test Equipment

Analyzers, Clamp Ammeters, Clamp Volt-Ammeters, Tube-checkers, Vacuum Tube Voltmeters, Ohmmeters, Circuit Testers, Volt-Ohm-Milliammeters, Volt-Ohmmeters, Power Level Meters, Voltmeters, Output Meters, Insulation Testers.

Thermometers

Electrical Type – Remote Indicating. Bimetallic Dial Type – Industrial, Testing, Dairy, Contact Making. Glass Thermometers and Hydrometers. Relative Humidity Indicators, Separable Sockets, Hubs, Flanges.

Moisture Meters

For Beans, Coffee, Cottonseed, Grains, Granular Materials, Lumber, Nuts, Plastic, Powders, Sheet Materials, Seeds, Tobacco, Wood.



WESTON Model 1

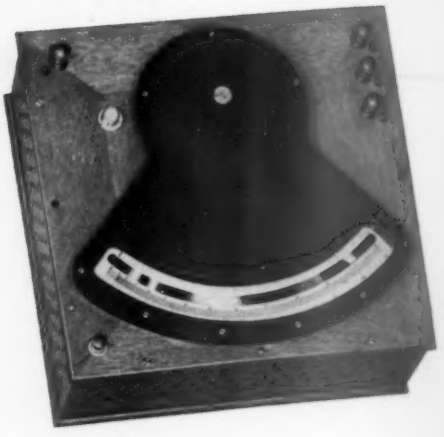
The original, and still highly popular D-C portable reference standard. Available as Voltmeters, Millivoltmeters, Ammeters, Milliammeters, Microammeters, Megohm Voltmeters, Electrolysis Volt-Ammeters, Electrolysis Volt-Millivoltmeters.

ELECTRICAL WESTON INSTRUMENTS

*Reg. Trade Mark

Instruments for All Classroom

WESTON Laboratory Standards (1/10 of 1% class)



WESTON Models 5 and 326 are the world's primary standards for instrument checking, and for all critical measurements. Model 5 D-C instruments available as Voltmeters and Ammeters. Model 326 available as A-C and D-C Voltmeters, A-C and D-C Ammeters, and single phase Wattmeters.

WESTON Standard Cells—long recognized and used as the world standard of electromotive force. Available in laboratory types . . . as well as in a special student type which is exposed to view for inspection and study.

Model 564 D-C Volt-Ohmmeter



An extremely compact instrument which is widely used where testing and experimentation require only D-C voltage or resistance measurements. The ranges have been carefully planned to provide the electrical measurements frequently needed for student instruction. Size approximately 5½" x 3⅜" x 2 $^{29}/_{32}$". Approximate weight 1¾ lbs.

Clamp Volt Ammeter Model 633



Provides five full scale A-C current ranges of 1000/250/100/25/10 amperes with range overlap. Three self-contained A-C voltage ranges of 700/350/175 volts—insulated for 750 volts. Has convenient 6-position switch easily operated by thumb—adjustable pointer stop facilitates measuring the starting current of motors.

WESTON Portable Test Instruments

Model 785 Industrial Circuit Tester



Ideal for school use as it provides 28 A-C and D-C voltage and current, and resistance ranges. D-C sensitivity 20,000 ohms per volt. In steel or oak carrying cases—measures only 13" x 12½" x 5½".

Illumination Meters



Available in Model 703, pocket-size, range 0-75 foot candles. Also Model 614 with three ranges available through switch . . . 0-60/0-120/0-600 foot candles. With VISCOR® and cosine correction filters, measures all types of lighting direct, without correction factors.

and Laboratory Requirements

WESTON Portable Standards (¼ of 1% class)



The WESTON Model 310 line consists of a series of portable electrodynamometer A-C and D-C instruments widely used as secondary standards throughout industry and educational institutions. Available as A-C and D-C Voltmeters—A-C and D-C Ammeters and Milliammeters—D-C and single phase A-C Wattmeters—Polyphase Wattmeters—Power factor meters and Microfarad meters.

Model 931 — a series of low-cost portable A-C and D-C instruments available as voltmeters—ammeters—milliammeters—D-C microammeters—D-C and single phase A-C Wattmeters. Used extensively throughout industry and schools because they are compact, extremely rugged, and dependable. Model 931 has a new self-shielding mechanism which provides high magnetic protection. Large scale openings with long visible hand calibrated mirror scales. Size: 5 1/16" x 6 1/32" x 3½". Weight approximately 2½ lbs.



Model 901 — new, modern concept in portables with large, curved, shadow reducing windows for brilliant dial illumination, long 5½" hand calibrated, mirrored scales with knife edge pointers...electromagnetically shielded. D-C models have new self-shielding mechanism providing extremely high magnetic protection. Styled in ribbed, bakelite cases with carrying strap. Available in D-C Voltmeters, Volt-Ammeters, Ammeters, Milliammeters, Wattmeters; A-C Voltmeters, Ammeters, Milliammeters. Also A-C Rectifier Type Voltmeters, Milliammeters. Size: 7½" x 7¼" x 3⅝". Weight: 3¾ lbs.



WESTON Portable Test Instruments

Models 489 and 528 Miniature A-C and D-C instruments—low-cost but thoroughly dependable portables for general testing and laboratory work. Available as A-C or D-C Voltmeters, Ammeters, Milliammeters.



Model 281 Miniature D-C Instruments — available in single and multi-range portable models which are most convenient for student use. Features are: 1% accuracy, self-shielded mechanism, ruggedness, hand calibrated mirror scales, knife edge pointers. Size 4½" x 4½" x 1½".



Model 622 A-C and D-C Ultra Sensitive Instruments—a group of high-sensitivity instruments ideal for precision measurement of low potentials and minute currents. Available as D-C Voltmeters, Millivoltmeters, Milliammeters, Microammeters. A-C Thermo Ammeters, Thermo Milliammeters, Thermo Voltmeters also available.



Panel Instruments—available in all the types, sizes and ranges required for educational use; including instruments of high sensitivity for measurements encountered in electronics and nuclear physics. Mounting bases available with either 2, 3 or 4 binding posts.



"980 LINE" Weston Test Equipment



MODEL 985 CALIBRATOR

—extremely useful for TV school shop, and laboratory practice. Markers are provided for wave-form patterns, local tuner oscillator frequencies, and trap circuit alignment. Extremely useful for making linearity adjustments, calibrating signal generators, and determining signals of unknown frequencies. Generated markers are visible even at sound trap frequencies. Generated frequencies are *fundamentals* of the oscillator frequencies . . . not harmonics.

MODEL 983 OSCILLOSCOPE

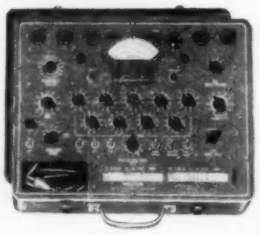


—a high gain, wide band oscilloscope. Band width of 4 megacycles allows accurate display of video frequencies, including pulse wave forms and color synchronizing bursts. High sensitivity of 17 millivolts per inch makes it ideal for setting resonant traps, as a general null indicator, and for signal tracing in low level stages, as well as for sweep frequency visual alignment of TV receivers. Has provisions for internal calibration, internal phased sine wave, and Z-axis intensity modulation. Reversal of polarity of both horizontal and vertical signals accomplished by means of toggle switching.



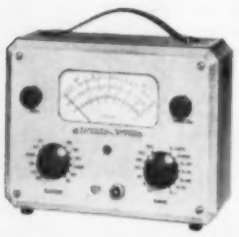
MODEL 984 SWEEP GENERATOR

—for efficient trouble shooting and lab practice in problems of sound and video IF circuits, associated trap circuits, TV tuners, video amplifiers and all-purpose visual alignment. RF OUTPUT: Frequency modulated signal, TV channels 2 to 13 inclusive, complete FM coverage available by means of two preset selector positions. FREQUENCIES ARE FUNDAMENTALS OF THE OSCILLATOR FREQUENCY. IF/VIDEO OUTPUT: Frequency modulated signals ranging to 50 megacycles, continuous tuning, signals free from harmonics. SWEEP WIDTH: Full 10 megacycles on all channels. OUTPUT VOLTAGE (RMS): 0.1 Volt, sweep is linear.



MODEL 981 *Proportional Mutual Conductance* TUBECHECKER

—provides meter measurement of leakage resistance as high as 5 megohms between tube elements . . . nine single circuit, twelve position selector switches protect against obsolescence . . . three toggle switches make it possible to check and compare sections of twin-section tubes at only one setting of selector switch . . . multiplier switch provides following high transconductance ranges: 3000, 6000, 12,000, 24,000 micromhos. Signal voltages of 5.2, 2.6, 1.3, and 0.65 volts are provided at a frequency of 5 kilocycles.



MODEL 982 VACUUM TUBE VOLTMETER

—a self-contained, battery operated Vacuum Tube Voltmeter, particularly useful in Radio and TV servicing and electronic courses involving peak to peak measurement of a-c voltages. Makes possible quantitative measurement of all complex wave form voltages utilized in video, sync and deflection circuits with no a-c line interference in critical measurements. Battery operation affords complete isolation from spurious response due to stray a-c fields and circulating ground currents.

MODEL 980 ANALYZER



—highly versatile, accurate and rugged volt-ohm-milliammeter with a combination of functional ranges which provide a wide range of test measurement applications in the electronic field. Has a d-c sensitivity of 20,000 ohms/volt, and an a-c sensitivity of 1000 ohms/volt. Accuracy is 2% d-c, 3% a-c. Range and functional switching is greatly simplified by use of a single dial for all ranges and functions.

Weston Electrical Instrument Corporation

REPRESENTATIVES IN ALL PRINCIPAL CITIES

578 Frelinghuysen Avenue, Newark 5, N. J.

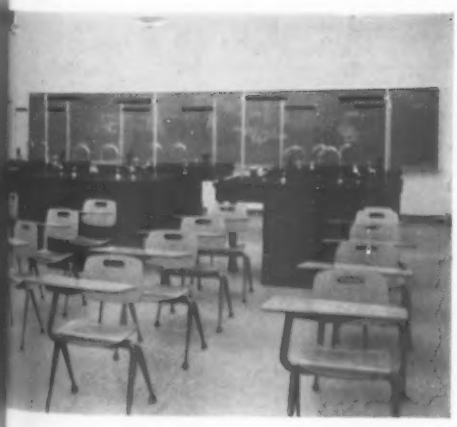
FOR HALF A CENTURY

F–2/Ke

Kewaunee Mfg. Co.

Educational Equipment





for LABORATORIES
HOMEMAKING
INDUSTRIAL ARTS
FINE ARTS

Kewaunee Research Gives You

MORE
- ▲ VALUE
- ▲ SPACE
- ▲ UTILITY
- ▲ FLEXIBILITY
- ▲ FACILITIES
- ▲ EFFICIENCY

SAVES
- ▲ TIME
- ▲ MONEY
- ▲ UPKEEP
- ▲ MATERIAL
- ▲ EFFORT

FIRST IN ENGINEERING
FIRST IN QUALITY
FIRST IN SERVICE



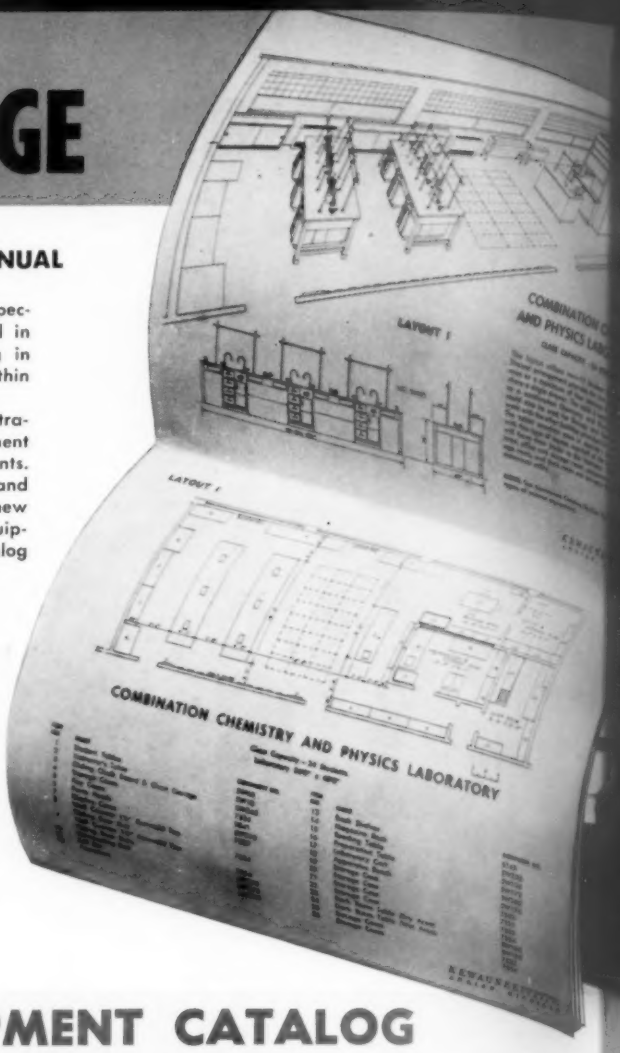
NEW 48 PAGE

HIGHLIGHTS OF THIS NEW PLANNING MANUAL

Engineered plan layouts and equipment lists. A visual perspective view of the room layout serves as a superlative aid in projecting the floor plans to actuality. There are roughing in plans which show the locations and type of plumbing within the equipment.

This manual is designed to aid the school boards, administrators, instructors and architects in selecting the proper equipment to meet the needs of the future as well as current requirements.

The cooperative effort of Kewaunee engineers, designers and the nations' leading educators has produced this wholly new concept of planning which in turn has brought forth new equipment, prime examples of which are to be found in Catalog Section 5, fully described and illustrated therein.



PROPER PLANNING IS ESSENTIAL TO CLASS ROOM EFFICIENCY

There is a pull sheet in the center of the Manual listing some of the more important information which is desired by our planning center engineers.

The Heads of your various departments know what your class rooms need. Your school officials are cognizant of funds available. Our engineers can then make complete room layouts, together with roughing-in layouts and specifications with concern as to the needs and budget.

So when you're contemplating new class rooms or the renovating of existent rooms, take advantage of Kewaunee's Planning Center. There is no cost or obligation whatsoever for this service.

A NEW LABORATORY EQUIPMENT CATALOG



No. 6449 Four student elementary shop bench.



No. 5W140 General purpose table.



No. 6376 Drafting Table.

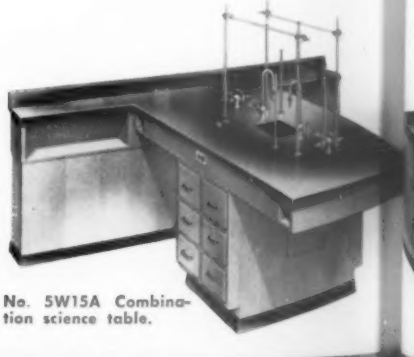
Illustrated on these two pages are just a few of the hundreds of items manufactured by Kewaunee. For a more complete selection of equipment in the classification of your interest, send for a copy of the catalog you desire, as shown on the opposite page.



No. 5W185 Dark room developing Table.



No. 5W6 Instructors desk with movable table.



No. 5W15A Combination science table.





LANNING MANUAL SECTION 5A



PLANNING AND ENGINEERING SERVICE

No product is better than it is engineered. At left is a section of our modern air conditioned Engineering Department where an engineering personnel of fifty persons not only prepare detailed working drawings for fabrication of products, but also design equipment to meet the specific needs of our customers. Kewaunee engineers are well qualified to recommend floor plan layouts and educational equipment of all types. Without obligation, we will prepare drawings for our customers and for architects.

Consult your Kewaunee engineers for any of your equipment problems; a call or letter to Kewaunee main office is all that is necessary. Arrangements are made to your convenience.

CATALOG SECTION 5 HIGHLIGHTS

These are just a few of the many important new developments to be found in this newest Kewaunee catalog pictured at right. The Perimeter type science tables for four students permits greater versatility of planning. The Pittsburgh eight student combination science table is a real worth-while space saver. The Pelton combination science table is a totally new concept for perimeter room planning. The Munch type biology table is an entirely new design, with its artist type tops for sketching and a removable stainless steel dissecting tray top for easy cleaning.

Space does not permit full details of all the equipment in this new catalog so why not send for your copy today and see for yourself the completeness of the Kewaunee system.



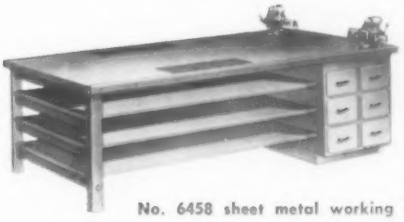
Kewaunee Manufacturing Company
5099 S. Center St. **Adrian, Michigan**

SECTION 5 IS AVAILABLE UPON REQUEST

Laboratory Equipment for Secondary Schools and Junior Colleges.

Advanced Science Equipment
Homemaking Equipment
Industrial Arts Equipment
Arts and Crafts Equipment
Library Equipment

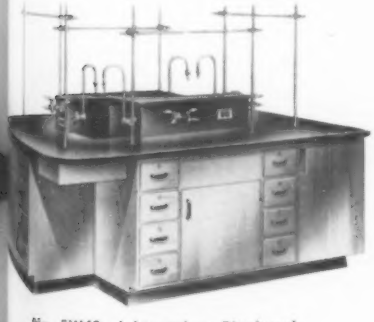
Your request for any of the above publications will be promptly filled.



No. 6458 sheet metal working table.



No. 5W100 two-student Munch type Biology table.



No. 5W40 eight-student Pittsburgh combination science table.



No. 6476 coremakers bench.



No. 6903 ceramic center table.





CASEWORK FINISHES—
The three representative samples pictured on this page are as accurate as possible with modern printing processes. Also, variations in color and grain of wood result in a variation of final stained or finished color.

At lower left is No. 156 Natural Oak.

At upper left is No. 151 Dark Golden Oak.

At upper right is No. 152 Light Golden Oak.

Standard table tops shown in black are Kemrock and Kemweld; and the two tops in color are known as Greenweld and Grayweld.

Other top materials are Kemblack, Kemgreen, Kemgray, soapstone, Kemstone, Transite, formica, stainless steel, and linoleum. Standard thickness of these tops is 1¼".

Complete specifications covering all top, case work finishes, materials are available upon request.



In keeping with modern color decor, Kewaunee presents for your selection, three beautiful finishes on oak. Oak, northern grown is one of the most durable, rugged, yet handsomely grained woods available for the construction of quality educational equipment.

All wood processed by Kewaunee is properly seasoned, kiln dried and tempered under rigid laboratory quality control.

Thus, you are assured that the precision machining and expert craftsmanship does give visible and lasting quality to products produced at Kewaunee. It is this quality that has made Kewaunee the foremost leader in the educational equipment field.



KEWAUNEE RESEARCH DEVELOPMENTS

Kewaunee pioneered in the design, engineering and manufacture of what are now known as airflow controlled fume hoods. Originally, they were intended for use in the safe handling of radioactive material. They have since been adapted for use of bacteria, virus and toxic substances as well. This equipment must be of approved design. Pertinent statistical data together with a selection of standard catalog items are available in a publication entitled, "Air Flow Control."

The CBR System is a wholly new concept to the Research Laboratory field and its profound aspects are necessarily beginning to enter the field of education. The CBR System is a Kewaunee engineered product. It is explained in its entirety in a Kewaunee publication called the CBR System. Your request for a copy will be promptly filled.

Kewaunee's continual diligent research is your assurance that its products will always be the most advanced in design, construction and utility.

it will pay you well



. . . to discuss your pl[illegible] a specially trained, experienced Kewaunee Educa[illegible] Equipment Engineer.

Kewaunee repres[illegible]tives in all principal cities.

NEED NEW EDUCATION EQUIPMENT?

The first step and the most important is to consult Kewaunee prior to and during the planning stage. It will save time and needless expense, and will result in the most efficient arrangement of just the equipment needed. There is no cost or obligation for this service. Start with the man who knows—the Kewaunee Equipment Engineer. Request for a representative or for catalogs should be made direct to Kewaunee at Adrian, Michigan.

Educational Equipment for

- LABORATORIES
- HOMEMAKING
- INDUSTRIAL ARTS
- ARTS AND CRAFTS
- LIBRARIES
- ADVANCED SCIENCE

Kewaunee

MANUFACTURING COMPANY

5099 S. CENTER ST. ADRIAN, MICHIGAN

F-2/Kn

ACID PROOF KNIGHT-WARE LABORATORY EQUIPMENT

HAT KNIGHT-WARE IS

Knight-Ware is an improved ceramic product having a tight, fine-grained body which is tough, uniform, thoroughly vitrified and wholly inert to the action of acids, alkalis, chemicals and corrosive solutions and gases, weak or strong, hot or cold. Its acid-proof qualities do not depend upon any glaze, enamel or cover. "It is the body itself."

Knight-Ware is light weight yet mechanically strong, and is attacked only by glass or fused silica for acid resistance.

A typical specification should read, "All parts of plumbing and ventilating system subject to the action of chemical wastes, fumes or chemical corrosion shall be of Knight-Ware as manufactured by Maurice A. Knight of Akron, Ohio."

re Used

Knight-Ware Laboratory Sinks, Table Troughs, Sumps and Pipe are used in school, university and commercial laboratories, hospitals, in newspaper buildings and wherever acid-proof waste or ventilating lines are necessary.

Knight-Ware Plant Equipment is used by the manufacturer or the user of chemicals, and in processes where contamination must be avoided.

ypical KNIGHT-WARE Installations

leges
n University
ion College
n University
wer College
nia University
University
kins
City University
ne
University
York University
stern Technical Institute
State University
State University
on University
e University
n University
rsity of Arkansas
rsity of California
rsity of Southern California
rsity of Cincinnati
rsity of Detroit
rsity of Washington
gton University
ney College
Virginia University

itals
morial
ia Presbyterian Medical
York Cornell Medical Center

Research Institutes
Batelle Memorial
Mellon Institute

Publishing
Washington Post
Philadelphia Inquirer
Art Gravure Building of New York
Cleveland Plain Dealer
Crowell-Collier Publishing Co.
Hearst Publishing Co. Bldg. of New York
New York Daily Mirror Bldg.
New York Herald Tribune Bldg.
United States Government Bureau of Engraving and Printing

Industrial
Abbott Laboratories
Merck Company
American Viscose
Canadian Industries, Ltd.
Firestone Research
Ford Motor Co.
General Electric Co.
Goodyear Tire & Rubber Co.
The Sterling Drug Co.
Western Electric Co.
G. D. Searle & Company
Parke, Davis & Company
Hoffman-La Roche, Inc.



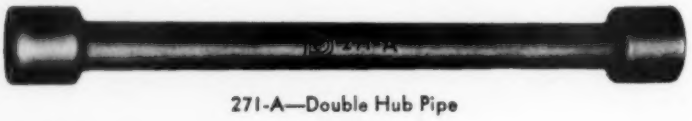
MAURICE A. KNIGHT • AKRON 9, OHIO

ACID WASTE-PIPE AND FITTINGS

Knight-Ware Bell and spigot pipe and fittings are available in any bore from 1 up to 60 in. in any lengths up to 5 ft. Special fittings for unusual places or to eliminate unnecessary joints are furnished at no great increase in cost. Flanged or plain ground end connections can be furnished where desired.

Knight-Ware Acid-Proof Traps supply their own liquid seal when in use, and thus prevent or minimize the escape of gases from the waste system.

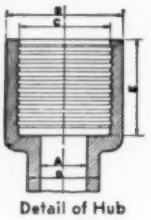
Knight-Ware B&S joints packed and poured to our specifications are absolutely acid and leak proof. Installation is no more difficult than with ordinary cast iron pipe.



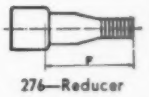
271-A—Double Hub Pipe

271 and 271-A—Single and Double Hub Pipe

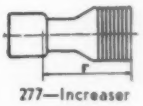
Supplied in bores up to 12 inches—larger if desired. In large installations, 10 to 15 per cent of the straight lengths should be of the Double Hub type, so when it is necessary to cut pipe, both pieces may be utilized. All hubs are deep—and both hub and spigot ends are well corrugated to insure a leak-tight joint.



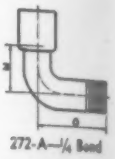
Detail of Hub



276—Reducer



277—Increaser



272-A—¼ Bend

272-B—⅛ Bend

271—Single Hub Pipe

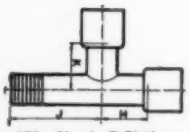
A in.	D in.	Lgth. feet	271 Wt. per ft.
1	1⅝	1 to 3	2¼
1½	2¼	1 to 5	3¼
2	2¾	1 to 5	4
3	4	1 to 5	5½
4	5	1 to 5	8½
5	6	1 to 5	11
6	7¼	1 to 6	15
8	9½	1 to 6	20
9	10½	1 to 6	24
10	11¾	1 to 6	28
12	13¾	1 to 6	36

272-A and 272-B

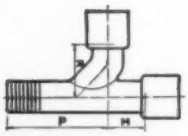
Bore in.	N in.	O in.	Wt. lbs.
1	4	8	2½
1½	4	8	3½
2	4	8	4½
3	4	8	8½
4	6	10	12¾
5	6	10	17
6	6	10	23
8	10	14	40
9	10	14	48
10	10	14	56
12	12	16	84



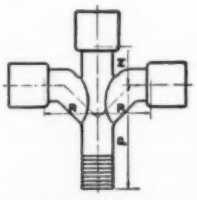
272-D—Twin Elbow



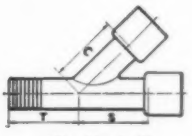
273—Single T-Fitting



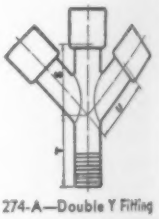
273-A—Single T-Y



273-B—Double T-Y



274—Single Y

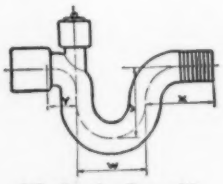


274-A—Double Y Fitting

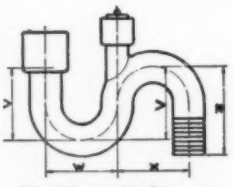
Bore in	N in.	O in.	272-D Wt. lbs.	Bores in.	J in.	H in.	K in.	273 Wt. lbs.	P in.	M in.	R in.	273-A Wt. lbs.	273-B Wt. lbs.	S in.	T in.	U in.	274 Wt. lbs.	274-A Wt. lbs.
1	4	8	4½	1x1	8	4	3	5	8¾	3¼	3	5	6	6	6	6	5	7½
1½	4	8	6	1½x1½	8	4	3	8	8¾	3¼	3	6	7	6	6	6	8	10½
2	4	8	7	2x2	8	4	4	10	8¾	3¼	3	8	8½	6	6	6	10	12
3	4	8	11	3x3	8	4	4	13	8¾	3¼	4	10	12	8	8	8	12	15
4	6	10	20	4x4	12	6	5	23	13¼	4¾	6	23	28	10	8	10	22	27
5	6	10	29	5x5	12	6	5	30	13¼	4¾	7	27	38	12	9	12	30	36
6	6	10	36	6x6	12	6	6	34	13¼	4¾	8	35	52	12	9	12	42	47
8	10	14	55	8x8	14	10	8	60	16	8	12	64	85	16	12	16	73	80
9	10	14	72	9x9	14	10	9	72	18	8	12	85	105	18	12	18	95	105
10	10	14	90	10x10	14	10	10	85	18	8	14	110	110	20	12	20	110	125
12	12	16	125	12x12	14	10	12	105	18	9	14	125	140	22	12	22	150	185



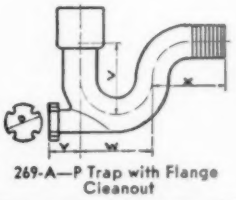
267-A—Running Trap with 2 Cleanouts



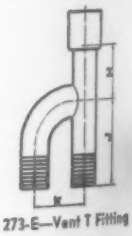
267—Running Trap with Single Cleanout and One Plug



268—S Trap with Cleanout



269-A—P Trap with Flange Cleanout



273-E—Vent T Fitting

Bore in.	V in.	W in.	X in.	Y in.	267 Wt. lbs.	267-A Wt. lbs.	V in.	W in.	X in.	Z in.	268 Wt. lbs.	D in.	V in.	W in.	X in.	Y in.	269-A Wt. lbs.	Bores in.	J in.	H in.	K in.	273-E Wt. lbs.
1	4	4	6	3	7	8	4	4	4	5	6½	4	4	4	6	2¼	5	1x1	8	4	4½	4
1½	6	6	6	3	8	10	6	6	6	7½	7½	4	6	6	6	3¼	8	1½x1½	8	4	5½	8
2	6	6	7	4	15	17	6	6	6	7½	14	4	6	6	7	3½	11	2x2	8	4	5¾	10
3	8	8	8	4	20	25	8	8	8	10	19	5	8	8	8	4½	21	3x3	8	4	7	13
4	9	9	9	5	35	40	9	9	9	11½	30	5	9	9	9	5	30	4x4	12	6	8½	22
5	9	9	10	5	44	58	9	9	9	12	42	5	9	9	10	5¾	43	5x5	12	6	10½	32
6	10	10	10	6	58	63	10	10	10	14	52	5	10	10	10	6½	52	6x6	12	6	11½	48
8	15	15	12	8	100	112	15	15	15	20	95	6	15	15	12	7	95	8x8	14	10	13½	73
9	16	16	14	8½	130	138	16	16	16	22	125	6	16	16	12	8½	130	9x9	14	10	15	90
10	18	18	14	9	155	165	18	18	18	24	150	6	18	18	14	9	148	10x10	14	10	16	100
12	20	20	18	10	220	235	20	20	20	26	220	6	20	20	18	10	220	12x12	14	10	19	120

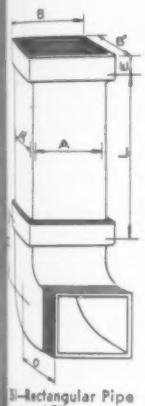
QUIPMENT

VENTILATING EQUIPMENT

Protection against acid and other corrosive gases or fumes in the installation of ventilating pipes and fittings may be even more important than in the case of laboratory waste and drainage lines. Vent lines are often built solidly into walls as a permanent installation. Repair or replacement, due to corrosion caused by a leaking ventilating system, may therefore be serious and costly.

A ventilating system acts as a huge condenser for the acid fumes, which are collected in the form of highly concentrated acids or chemicals without possibility of dilution or drainage. That is why leading colleges, universities, high schools, hospitals and commercial laboratories—built for permanence—specify Knight-Ware Acid-Proof Ventilating Pipes and Fittings.

Knight-Ware Ventilating Pipes and Fittings will permanently withstand any acid, alkali or corrosive—hot or cold—weak or strong—hydrofluoric acid alone excepted. Knight-Ware Ventilating Pipes and Fittings should be ordered the same as Waste Lines and Fittings—referring, if possible, to figure numbers in Tables as shown below, also dimensions, including sketches or blueprints of special fittings.



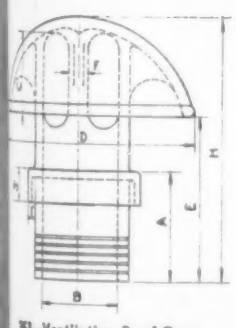
351—Rectangular Pipe and Elbow

Round and Rectangular Ventilating Pipes and Elbows

Either round or rectangular Knight-Ware Acid-Proof Ventilating Pipe and fittings can be furnished in the various sizes as given in the Tables at right. Special sizes and dimensions are also available. Blueprints and sketches must accompany your order for special piping.

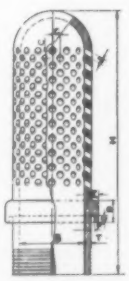
When ventilating pipe must be installed in spaces too limited for regular socket joints, we supply a ventilating pipe with plain, ground butt-ends for banded joints. These are made in standard sizes as well as for special requirements.

Ventilating Roof Caps—Two Types



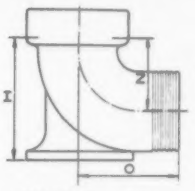
353—Ventilating Roof Cap

Illustrated are two kinds of Knight-Ware Ventilating Roof Caps, although we can furnish other types. Types shown are made to exclude rain, snow, etc. Combined area of openings exceeds three times cross-sectional area of cap, which provides ample security against back-pressure. Note provision made for flashing.



352 Ventilating Roof Cap

Base Elbows for Ventilating Pipe



272-AB—Base Elbow

A Base Elbow is used to start off a ventilating line from a hood. Special designs can be furnished. Both right and left offset types such as shown in picture on page 4 can also be furnished.

For Dimensions in Table of Round Pipe See Details of Hub on Page Two

A in.	D in.	C in.	B in.	E in.	L ft.	271 Round Wt. per ft.
10	11¾	13¼	15	4	1 to 5	28
12	13¾	15¼	17	4	1 to 5	36
15	17	19¼	21	4	1 to 5	45
18	20	22¼	24½	4	1 to 5	70
20	22	24½	26½	4	1 to 5	80
24	26½	28½	30½	4	1 to 4	95
27	29½	31¾	33¾	4	1 to 4	110
30	32½	34¾	36¾	4	1 to 4	120

A_1 in.	A in.	B_1 in.	B in.	E in.	L ft.	N in.	O in.	351 Rect. Wt. per ft.
8	12	13½	17½	4	1 to 5	10	16	33
10	15	15½	20½	4	1 to 5	10	16	45
12	18	18	24	4	1 to 5	12	18	60
15	20	21	26	4	1 to 5	14	20	95
18	24	24	30	4	1 to 5	16	22	140
20	30	26	36	4	1 to 4	18	24	165

B in.	C in.	D in.	E in.	F in.	G in.	H in.	J in.	T in.	352 Wt. lbs.
6	¾	3	1	½	¾	30	¾	¾	45
8	1	3	1	½	1	30	¾	¾	60
9	1	3	1	½	1	36	1	1	80
10	1	3	1	½	1	36	1	1	90
12	1	3	1	½	1	36	1	1	115

A in.	B in.	C in.	D in.	E in.	F in.	H in.	353 Wt. lbs.
10	6	7	16	17	1½	24	60
10	8	7	22	16	2	24	80
10	9	8	24	15	2¼	24	100
10	10	9	26	14	2½	24	120
10	12	10	30	12	3	24	145

ACID-PROOF FLOORING

PERMANITE Floors are superior to wood, concrete or ordinary acid-proof flooring. They are constructed of special non-skid vitrified brick bonded by PERMANITE cement.

These floors are designed for rugged endurance as well as for acid resistance. They are impervious to strong alkali cleaners, oils, fats and greases as well as most acids. PERMANITE Floors are easily cleaned and will withstand steam sterilization without softening. Recommended for laboratories, food processing plants, metal plating rooms and chemical plants.


Permanite floor of non-skid, vitrified brick and Permanite cement

KNIGHT-WARE "IT IS THE BODY ITSELF"

LABORATORY EQUIPMENT

KNIGHT-WARE SUMPS

We supply two types of Knight-Ware Sumps and Dilution Basins. The smaller Type "B" has only one inlet, while the larger Type "A" may have several at any desired position. Cover on "B," in either flat or dome shaped style, is provided with bolt holes. Cover for "A" can be furnished flanged if preferred.

400 — Style "A" Sumps

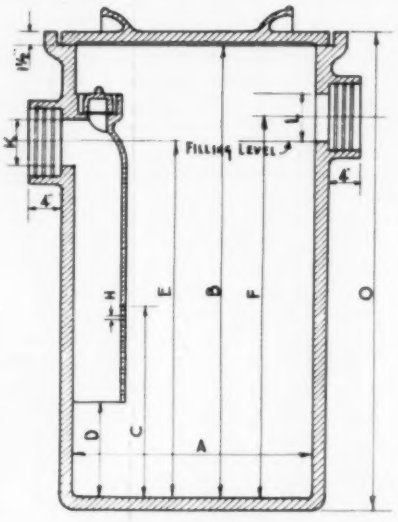
A in.	B in.	C in.	D in.	E in.	F in.	H in.	K in.	L in.	O in.	Weight lbs.
30	57	24	12	45	48	½	4-6	4-6	60	700
36	75½	36	12	57	60	½	4-6	4-6	78½	1100

(All Dimensions Are In Inches)

401 — Style "B" Sumps

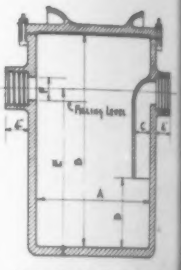
A in.	B in.	C in.	D in.	E in.	F in.	Weight lbs.
12	12	2	3	8	2	75
18½	24	3	12	17	3	175
24	36	4	12	28	4	400

(All Dimensions Are In Inches)



400—Style "A" Sumps



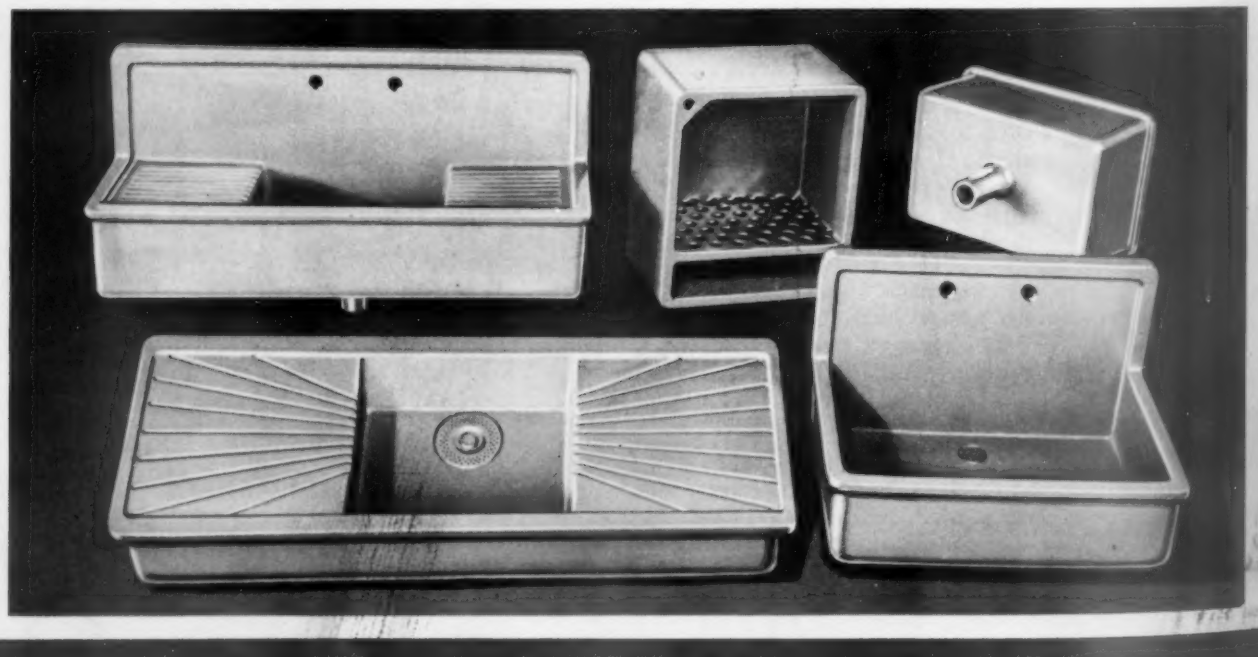


401—Style "B" Sumps

KNIGHT-WARE SINKS

Knight-Ware Laboratory Sinks are custom built to suit your requirements. Because they are entirely handmade, it costs no more for this service. The one-piece construction, smooth surfaces, rounded corners and acid-proof quality mean a freedom from leaks and a cleanliness that is permanent. Outlets of various designs, back, drainboards and apron are optional as an integral part of sink.

Please submit sketch and dimensions when requesting quotation on sinks or tanks. *Complete catalog will be sent on request.*



MAURICE A. KNIGHT • AKRON 9, OHIO

EASTERN OFFICE: 130 W. 42nd ST., NEW YORK CITY

ST. LOUIS · SAN FRANCISCO · DETROIT · JOHNSON CITY · NIAGARA FALLS · MINNEAPOLIS · CHICAGO · HOUSTON · DENVER · PHILADELPHIA · MONTREAL · TROY, N. Y.

METALAB *Equipment Corp.*

MANUFACTURERS AND ENGINEERS

EDUCATIONAL LABORATORY

✳GENERAL SCIENCE ✳ DOMESTIC SCIENCE

✳ARTS and CRAFTS ✳ MULTI-PURPOSE EQUIPMENT

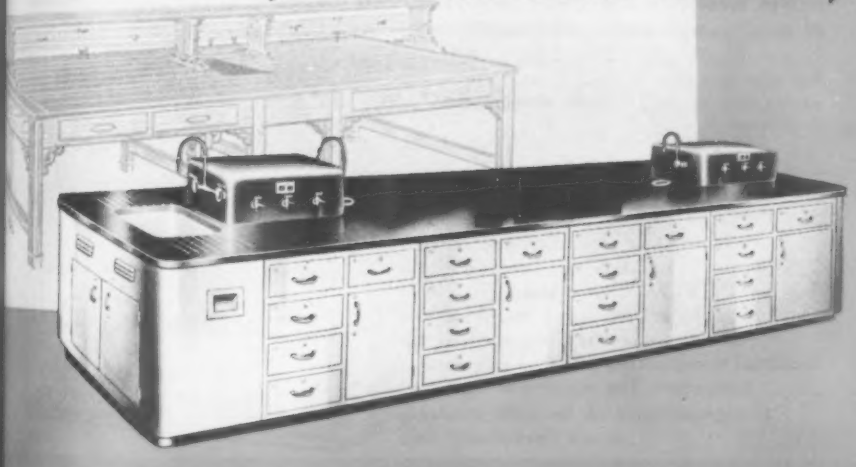
SCHOOL DESIGNERS SET THE PATTERN . . .

For The Modern School Building

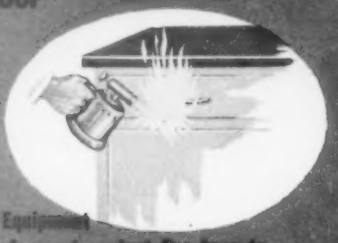


SCIENCE AND INDUSTRY SETS THE PACE . . .

For The New School Laboratory

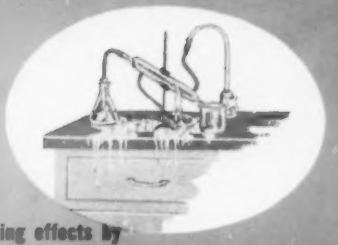


FIRE-PROOF



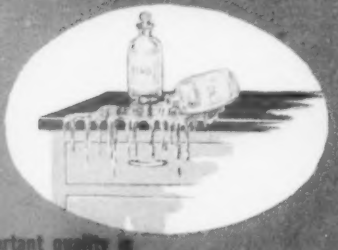
METALAB Equipment is your safe-guard against fire hazards.

WATER-PROOF



No damaging effects by water if your laboratory is METALAB equipped.

CORROSION-RESISTANT



This important quality is indispensable in school laboratory equipment.

RUGGED—DURABLE



METALAB Equipment has inherent qualities of welded construction plus proven resistance.

ECONOMY



Production line manufacturing techniques are translated by METALAB into better and economical laboratory equipment.

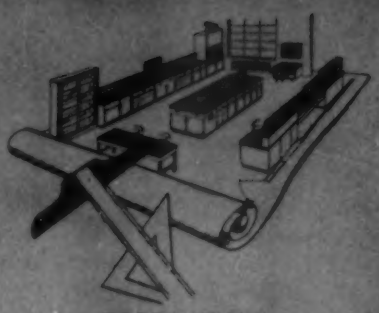
THE TREND IS TO METAL...THE STANDARD IS METALAB

PROGRESS is the major consideration in all the plans you make for your new school building. Likewise, progress underlies the entire design and construction of the new METALAB Educational line. Relegated to the past is the old fashioned wood type furniture. The transition to metal equipment has taken place in the Industrial and higher Educational Fields, and is rapidly gaining momentum in the Secondary Schools.

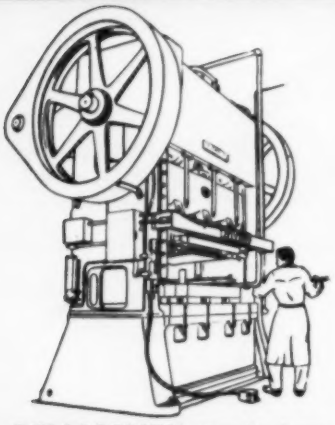
METALAB *Equipment Corp.*

272 DUFFY AVENUE HICKSVILLE LONG ISLAND NEW YORK

FURNITURE AND EQUIPMENT SELECTED FROM THE COMPLETE METALAB CATALOG 48.



RESEARCH—
Means better engineering



RELIABILITY—Results from production plus performance

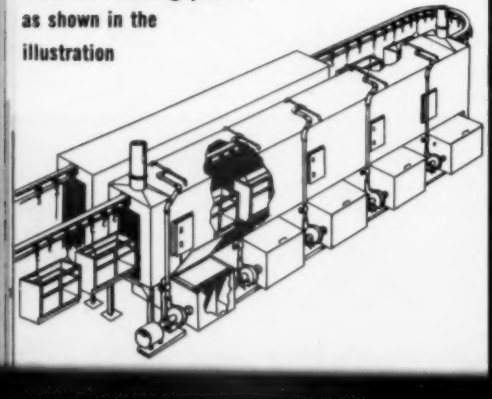


RECOGNITION—Comes from many satisfied customers.

Every METALAB product is controlled for quality and precision craftsmanship. The use of the finest laboratory-tested raw materials results in a product excellence and uniformity which is unsurpassed.

The metal preparation processes are thorough and effective, consistent with the many quality features of METALAB Equipment.

After fabrication METALAB Equipment goes through a multi-stage cleaning and chemical bonding process as shown in the illustration



3-R's

METALAB's . . .

RESEARCH — A combination of engineering research and production development.

RELIABILITY — Thousands of installations in the nation's finest laboratories.

RECOGNITION — The fastest growing firm in the laboratory furniture industry.

FROM A ROUGH IDEA . . . TO THE FINISHED JOB . . . COMPLETELY COORDINATED

We have had many years of experience in the application of the most modern techniques of labaratory planning. Your individual planning problems can be analyzed from the standpoint of economy, laboratory space and layout, types of services, and coordination of facilities.

Every METALAB product is controlled for quality and precision craftsmanship. Our tool room produces tools, dies, and fixtures that guarantee uniform tolerances and quality; thus, the product moves through the plant with each operation, quality-controlled — resulting in a product excellence and uniformity that is unsurpassed. To this add the production advantages of an expanded one story plant, complete with material handling equipment, and the reason for economical production becomes apparent.

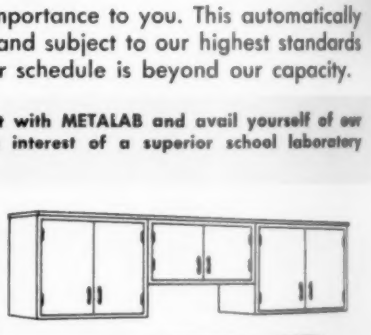
METALAB is ever aware of the increasing needs of the vastly expanding world of Science and Industry. This knowledge has prompted us to strive to give greater value and better service. Consequently, we have achieved a gratifying measure of confidence and patronage.

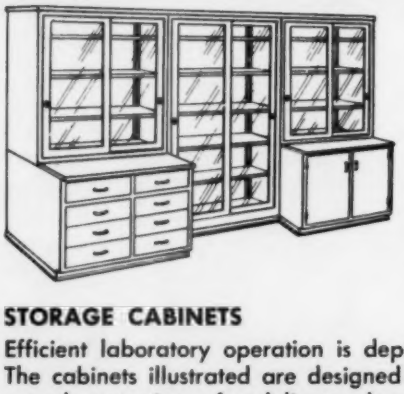
We know that your needs are of vital importance to you. This automatically makes them of prime importance to us, and subject to our highest standards of quality and service. No installation or schedule is beyond our capacity.

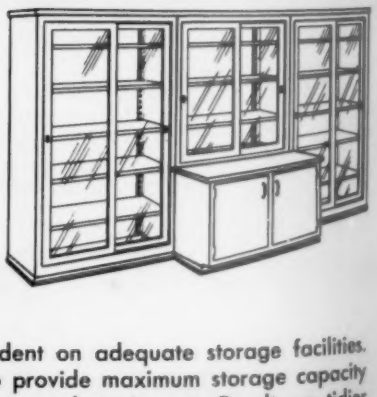
Put your best foot forward . . . start your project with METALAB and avail yourself of our engineering service, without obligation, in the interest of a superior school laboratory installation.

HOMEMAKING WALL ASSEMBLY
CAT. NO. 6415

Homemaking and Domestic Science Department Heads have approved of the "LIFE-SITUATION" method of training students. METALAB has taken this trend into consideration when they evolved this Sectional Homemaking and Domestic Science Equipment. The equipment illustrated is representative of the units available in our Educational line.





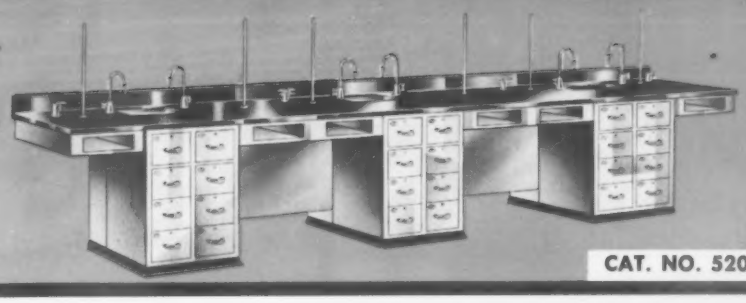


STORAGE CABINETS

Efficient laboratory operation is dependent on adequate storage facilities. The cabinets illustrated are designed to provide maximum storage capacity — and protection — for delicate glassware and equipment. Result — a tidier laboratory, lower operating costs. Storage assemblies can be designed with Standard Sectional Units, to meet your requirements. An unlimited variety of assemblies may be achieved by this method.

6 STUDENT DESK

16′ 0″ Long,
30″ Wide,
37″ High



CAT. NO. 5200

2 STUDENT TABLE F2/M

72″ Long, 24″ Wide, 31″ High



CAT. NO. 5540

METALAB *Equipment Corp.*

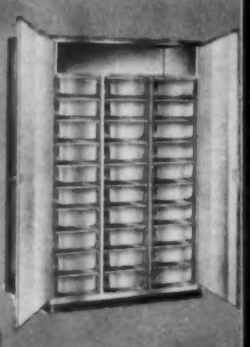
272 DUFFY AVENUE, HICKSVILLE, LONG ISLAND, NEW YORK

REPRESENTATIVES IN PRINCIPAL CITIES

METALAB
SCHOOL
EQUIPMENT

TOTE TRAY CABINET

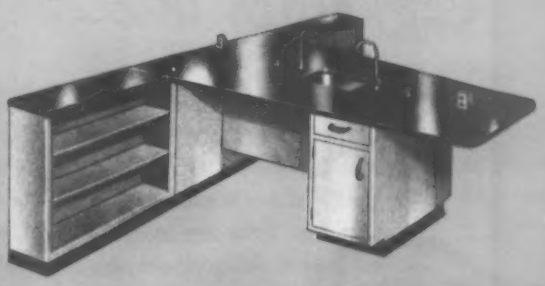
47″ Long,
22″ Wide,
84″ High



CAT. NO. 6440

MULTI-PURPOSE TABLE

This new line of Multi-Purpose Laboratory Tables — wall base cabinets and storage units combine to produce a variety of layouts that are particularly designed to take full advantage of maximum student accommodation in a limited floor area.



7000 SERIES

INSTRUCTOR'S DESK

8″-0″ Long,
30″ Wide,
37″ High



CAT. NO. 5750



CENTER TABLE

11′ 10″ Long (without sink)
54″ Wide, 37″ High
SINK: 24″ Long, 18″ Wide, 8″ Depth (O.D.)

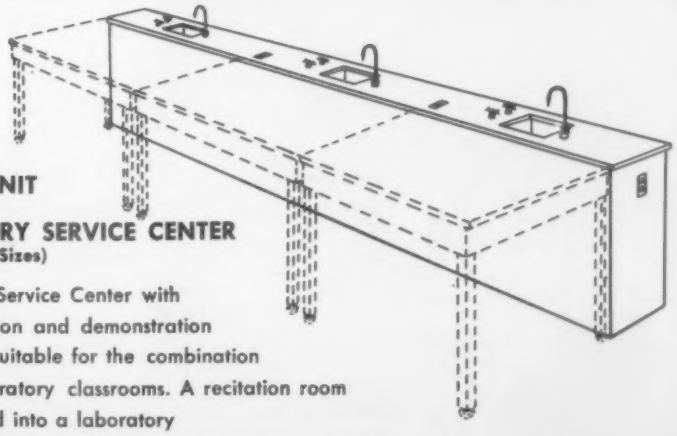
CAT. NO. 5920

METAL-AIRE FUME HOOD

47″ Long,
30″ Wide,
8′-0″ High



CAT. NO. MH47



LABMAKER UNIT

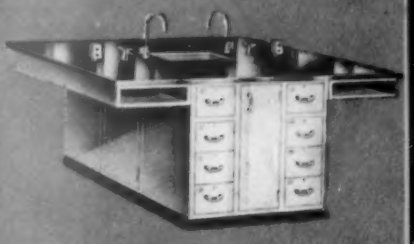
A LABORATORY SERVICE CENTER
(Available In All Sizes)

The Laboratory Service Center with mobile preparation and demonstration tables is highly suitable for the combination lecture and laboratory classrooms. A recitation room can be converted into a laboratory without any loss of time, or any expensive arrangements.

8000 SERIES

4 STUDENT — 4 CLASS

72″ Long,
48″ Wide,
37″ High



CAT. NO. 5130

METALAB ENGINEERING *Service*

This service offers you complete installation planning that will be incomparably superior to a poorly planned equipment program. Upon completion of an analysis by our Engineering Department we will present to you plans, specifications and budget estimates as a basis for your finished job. This service is available to you without obligation.





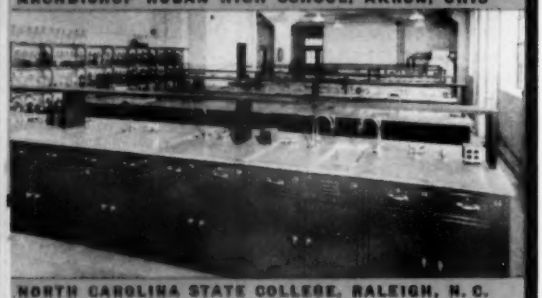
WEST HEMPSTEAD HIGH SCHOOL, L. I., NEW YORK



UNIVERSITY OF ILLINOIS, URBANA, ILLINOIS



ARCHBISHOP HOBAN HIGH SCHOOL, AKRON, OHIO



NORTH CAROLINA STATE COLLEGE, RALEIGH, N. C.



For METALAB's completely illustrated catalog on Educational Equipment and Furniture — write in today for detailed information and costs of the equipment that you may require.

METALAB *Equipment Corp.*

272 DUFFY AVENUE, HICKSVILLE, LONG ISLAND, NEW YORK

Consider this...

METALAB Equipment is to be found in thousands of leading laboratories including the most prominent names in Industry and Research. This equipment is new, only in the sense that it is now specially designed for school use, in the same quality of materials and workmanship. Take the inherent qualities into consideration when planning your laboratories. Vital developments often originate in the laboratory, and successful organizations give the utmost attention to this essential department. It is a matter of prestige, pride, and good business that they seek out the finest equipment for their laboratories, with a view to making them outstanding in their fields. Your METALAB equipped laboratory places you among these organizations or institutions equipped with the finest type of laboratory equipment made. Its specially-styled construction, combined with quality-tested materials, brings a new beauty, flexibility and utility to your laboratory — characteristics that reflect the quality of your product and the excellence of the service you render.

Throughout the land, in important plants, institutions, and schools, you will find METALAB installations. Distinguished by utility, beauty, and durability, METALAB Equipment contributes to the accomplishments of these laboratories.

The prestige we gain through serving you well is the foundation upon which METALAB is built.

THE ANSWER IS... METALAB!



THE MODERN METALAB PLANT

Exclusively engaged in the engineering and manufacture of superior laboratory equipment & furniture.

ALBERENE STONE CORPORATION OF VIRGINIA

QUARRIERS AND FABRICATORS OF ALBERENE STONE

419 Fourth Avenue, New York 16, N. Y.

Quarries and Mills at Schuyler, Va.

PRODUCTS AND THEIR PROPERTIES

Alberene Soapstone (Regular Grade)—is a natural quarried talcose rock produced and fabricated for sixty years in increasing quantities for the following purposes:

Laboratory table tops, shelving, splash backs, sinks, drainboards, gutters, pegboards, aquaria, tanks, moisture-proof cabinets, developing sinks and tanks, etc., etc.

This stone has an abrasive resistance factor (U.S. Bur. of Standards) of 6, and a maximum absorption of 0.2%. It is homogeneous, very dense and tough and finely granular in all directions; highly resistant to acid and alkali attack, entirely free of laminations (cleavage planes). It is possible to machine it without splitting, chipping or spalling. It is easily kept clean. Discolorations can be removed readily with a good scouring powder. Being uniform throughout, with no surface glaze, the surface can be readily touched up with sandpaper or by honing.

This stone is sometimes used where a low-temperature basic refractory is required, such as for the lining of lead oxide smelting furnaces.

A tougher variety of stone is known as Grade 25. This stone has an abrasive resistance factor of 20–40, and a maximum absorption of .075%. Grade 25 is more durable and more chemically resistant than the regular grade. When rubbed down with Alberene Polish it takes on a rich, dark, sleek appearance.



Slip-tongue Joint—for table tops



Tongue-and-Groove Joint—for fume hoods, tanks, sinks

LABORATORY EQUIPMENT CONSTRUCTION

Fixtures are practically one-piece structures of solid stone. Slip-tongue joint consists of a strip of corrosion-proof metal cemented in grooves, with abutting edges of stone slabs ground and sealed with acid-proof cement. Table tops have drip-groove to prevent under-running of corrosive liquids. Tongue-and-groove joint is used in sinks, tanks, hoods, etc. Construction is permanently gas and liquid-tight and germ-proof.

WIDESPREAD RECOGNITION AND USE

Leading colleges, industrial and research organizations use and recommend these standard laboratory materials.

Quarries and mills at Schuyler, Va., are largest in the world devoted exclusively to production and fabrication of special-purpose stone. Stocks are ample and deliveries can be made promptly.



Chemical Engineering Laboratory, Rensselaer Polytechnic Institute, Troy, N. Y.
FOR FURTHER INFORMATION, SEE ARCHITECTURAL SECTION.

LABORATORY FURNITURE CO., Inc.

Old Country Road, Mineola, Long Island, N. Y. Offices in Principal Cities

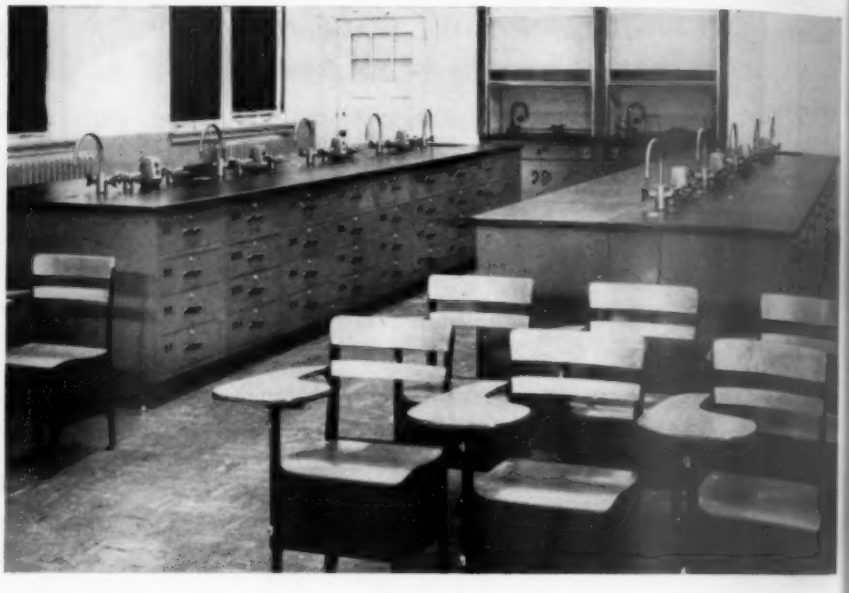
Make a permanent, fireproof capital invest

When you specify STEELAB—

you have specified safety . . . permanence . . . low maintenance . . . flexibility for expansion or modification of facilities.

Thirty five years of design and manufacturing experience centered exclusively on laboratory furniture stands behind today's STEELAB equipment. Over 45,000 installations in leading educational, industrial and hospital laboratories attest its merits.

Safeguard your investment in laboratory furniture — specify STEELAB.



Compare these outstanding features

Fireproof — STEELAB furniture gives you built-in fire protection. STEELAB laboratories, like modern buildings, are constructed of steel, stone and asbestos. There are no absorbent wood surfaces to support combustion.

Durable — STEELAB laboratories withstand year after year of severe use — and abuse. Parts are mechanically interlocked and welded to utilize fully the inherent strength of steel. Drawers and doors cannot warp, jam or stick. And modern finishing processes make STEELAB furniture impervious to rust, corrosion and abrasion.

Flexible — STEELAB's "Labflex" construction gives you built-in convertibility to meet changing needs. When expansion or alterations become necessary, the modular units can be rearranged in new combinations and their drawers and doors can be readily interchanged to afford maximum convenience.

Functional — STEELAB design reflects the desire of instructors and department heads for laboratory furniture that will help the student achieve maximum accomplishment. Students' tables and desks are trim and uncluttered to minimize tardy experiments and sluggish attention. Instructors' tables permit the greatest effectiveness in demonstrations. All equipment is designed to help the student assimilate instruction clearly and quickly. Finally, good appearance makes for better work, and STEELAB's color-blend enamel finishes that harmonize with interior color schemes keep their handsome appearance through years of daily use.

Economical — Where a capital investment in equipment is made, long service life and low maintenance costs are the truest measure of economy. But to hold down first cost as well, STEELAB furniture is standardized in design and fabricated on high speed production lines that make the most of time, labor and materials.

TIME TESTED FOR THIRTY FIVE YEARS

LABORATORY FURNITURE CO., INC.

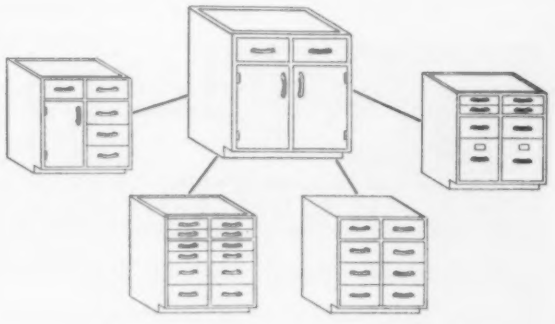
ment in STEELAB furniture

Only STEELAB gives you . . .

Labflex Design (patented) — Doors and drawers easily interchanged for adaptability to new or special requirements.

Lock-Joint Construction — Joints are notched, keyed and fitted together to make a rigid, mechanically interlocking joint before welding.

Molded Bakelite Hardware — with machined solid bronze core as standard equipment. Non-corroding, sturdy, permanent.



Modular units *plus* exclusive "Labflex" design permit custom assemblies on moderate budgets.

STEELAB Standardized Unit Construction Lets You Plan Assemblies to Suit Your Individual Needs



LABORATORY FURNITURE CO. DESIGNS, MAKES AND INSTALLS

TABLES		CASES AND CABINETS	CHEMICAL FUME HOODS
Science	Demonstration	Chemical	Open type
Physics	Instructor's	Apparatus	Closed type
Chemistry	Balance	Instrument	Air Conditioned
Biology	Dark Room Developing	Glassware	Special purpose
Home Economics	Bacteriology	Microscope	
Manual Arts	Microscope	Museum	Also acid-proof sinks and tanks, special fittings and accessories for laboratories.
Geology	Medical Research	Specimens	
Lecture	Private Laboratory	Acid Storage	
		Map and Chart	

The STEELAB engineering staff will be glad to consult with you on any laboratory planning problem. Write for detailed literature

MORE THAN 45,000 INSTALLATIONS

DURALAB EQUIPMENT CORP.

987 Linwood St., Brooklyn 8, N. Y.

Designers and Manufacturers of Laboratory Furniture and Equipment

LABS THAT LAST by DURALAB

SCHOOL LABORATORY FURNITURE & EQUIPMENT

STUDENTS WORK UNDER PROFESSIONAL CONDITIONS WITH DURALAB EQUIPMENT

Designed to withstand the continuous wear of school classes. Duralab Units are waterproof, fireproof, corrosion resistant, and are constructed of the finest materials; laboratory tested, and engineered to meet the latest scientific developments.

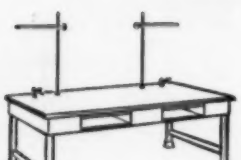


School Laboratories designed and equipped by Duralab to fit school budgets, yet containing all units necessary for full and professional operations.

Here are but a few of the nation's schools and institutions using Duralab Equipment.

- University of Minnesota, Minneapolis, Minn.
- Rutgers University, New Brunswick, N. J.
- University of Maryland, College Park, Md.
- The Johns Hopkins School of Medicine, Baltimore, Md.
- Aroostock State Teachers College, Presque Isle, Me.
- Henry C. Conrad High School, Wilmington, Del.

– DURALAB'S COMPLETE LINE INCLUDES: –



TABLES

Physics, Science, Biology, Bacteriology, Pathology, Histology, Pharmacology, Embryology, Physiology, Bio-Chemistry, Post-Mortem, etc.



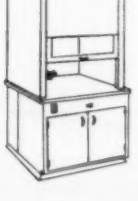
CASES

Notebook & Display, Key, Microscope, Skeleton, Glassware, etc.



CABINETS

Chemical, Storage, Chemical Storage, Utility Supply, etc.



FUME HOODS

Single & multiple compartment hoods, with or without sliding sashes.

Radiochemical Laboratory Equipment

Beta & Gamma Fume Hoods, Gloved Boxes, Wall Tables, Center Tables, etc.

DURALAB *Engineering* FEATURES

- Compact
- Maximum Storage Space
- Roomy and Noiseless Drawers and Cupboards
- Highly Functional



Write for our complete catalog or consult us today. Our planning services are at your disposal. No obligation!

DURALAB EQUIPMENT CORP., 987 LINWOOD ST., BROOKLYN 8, N.Y.

THE UNITED STATES STONEWARE CO.

ORKS (Since 1865): Akron, Ohio
HICAGO: 20 N. Wacker Drive
NEW YORK: 60 East 42nd Street
HOUSTON: 7621 Brykerwoods Dr.

GRAY-GLAZED CHEMICAL PORCELAIN LABORATORY SINKS



re, without a doubt, are the finest oratory sinks made today. Because y are solid, non-porous, one-piece struction, they are superior to stone. cause they are solid chemical porce- all the way through, they are perior to porcelainized steel. Because y are completely corrosion-proof roughout the entire body, they are perior to sanitary ware.

. S." chemical porcelain laboratory sinks are e only sinks made today which possess prac- ally universal chemical resistance. They can be ed safely to handle any solution encountered in e laboratory with no other precaution than nor- l routine rinsing.

. S." chemical porcelain laboratory sinks will nd any heat-shock encountered in ordinary lab- ory usage. Routine inspection tests include ermate filling with crushed ice and boiling water.

. S." chemical porcelain laboratory sinks are utifully designed, beautifully finished: one- ce construction without a single seam or joint; ooth rounded corners, inside and out; and a t, lustrous, non-staining blue-gray glazed finish t harmonizes with any color scheme.

"U. S." gray-glazed chemical porcelain sinks are made in a wide range of types and sizes. The popular undertable sink is carried in stock in some twenty standard sizes. Single and double drainboard sinks, with or without splash backs are stocked in the four most commonly used sizes. Special sizes can be made to order in any type sink. Other sink types readily available include curb back and box back types, cylindrical and hemispherical sinks, wall sinks, end table sinks, with and without trough cut-outs, and compartment sinks.

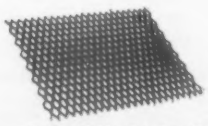
WRITE FOR BULLETIN L-8

Contains full technical data and dimensional detail on all "U. S." gray-glazed porcelain sinks, drain fittings, traps, sink stands, installation data. Free on request. Or see your laboratory furniture dealer.

Other U. S. Stoneware Products for the Chemical Laboratory



TYGON TUBING
e preferred tubing world over. mically resistant, ible, glass clear, gh. Available m your labora- y supply dealer a wide range of s. Ask for Bulle- T-87.



PROTECTOGRIDS
Designed to be used on the bottom of the sink or on the drainboards, these corrosion-resistant plastic coated metal grids save their cost quickly by reducing glass breakage. Available in a range of sizes to fit any sink.

SUMP TANKS
To neutralize sink acid wastes before they are run into the city sewer system, U. S. Stoneware offers a choice of two types of ceramic sump tanks; a small sump tank which can be placed directly under the individual sink, or larger units to handle the waste of a number of sinks.



CHEMICAL PORCELAIN PIPE AND FITTINGS
For a completely corrosion-proof drain system use white chemical porcelain pipe and fittings with easily assembled flange couplings. Fully described in Bulletin CP-50.



TYGON plastic PAINT
The ideal protective coating for laboratories and laboratory equipment. Resists virtually all chemicals normally encountered in laboratory work. Available in a range of attractive colors. Write for Bulletin 750.

ALUMINUM GREENHOUSES, INC.

14615 Lorain Avenue, Cleveland 11, Ohio

Everlite®

PREFABRICATED ALUMINUM CURVED-EAVE GREENHOUSES

"World's Most Beautiful"

The Nation's FIRST line of completely standardized, prefabricated aluminum curved glass eave greenhouses. Hundreds of installations in U.S., Canada and abroad.

RECENT INSTALLATIONS

D. C. Everest Jr.-Sr. High School
Schoefield, Wisconsin

Chester Sr. High School
Chester, South Carolina

Redford Sr. High School
Redford Township, Michigan

St. Mary's College
Notre Dame, Indiana

Huntington East High School
Huntington, W. Va.

Valley Forge Military Academy
Wayne, Penna.

University of Puerto Rico
Rio Piedras, Puerto Rico

Clio High School
Clio, Michigan

Lakewood High School
Lakewood, Ohio

Valparaiso University
Valparaiso, Indiana

Brookfield Union Free High School
Waukesha County, Wisconsin

Logan High School
Logan County, W. Va.



D. C. Everest Jr.-Sr. High School, Rothschild-Schofield, Wis.

EVERLITE — *Plus* — FEATURES

IMPORTANT . . .

• TO THE ARCHITECT

1. Assurance of complete owner satisfaction.
2. Lifetime construction.
3. Beautiful appearance.
4. Widest range of sizes including Free-Standing and Lean-To models.
5. Complete, precision prefabrication.
6. Foundation and assembly drawings for accurate detailing.
7. An EVERLITE specification can include automatic gas or oil-fired heating systems, ventilators, humidifiers and prefabricated Transite benches.

• TO SCHOOLS, INSTITUTIONS

8. Fireproof construction especially well adapted for roof installations.
9. Maintenance-free long life.
10. Ideal for "project" work—class, group or individual thesis.

• TO HOMEOWNERS

11. Easy and quick assembly—no skilled labor required.
12. Added, lasting value to property.
13. Low original cost—lowest lifetime cost.

PRICE LIST ON REQUEST

Aluminum Greenhouses, Inc.

14615 LORAIN AVENUE · PHONE CL 1-2345 · CLEVELAND 11, OHIO

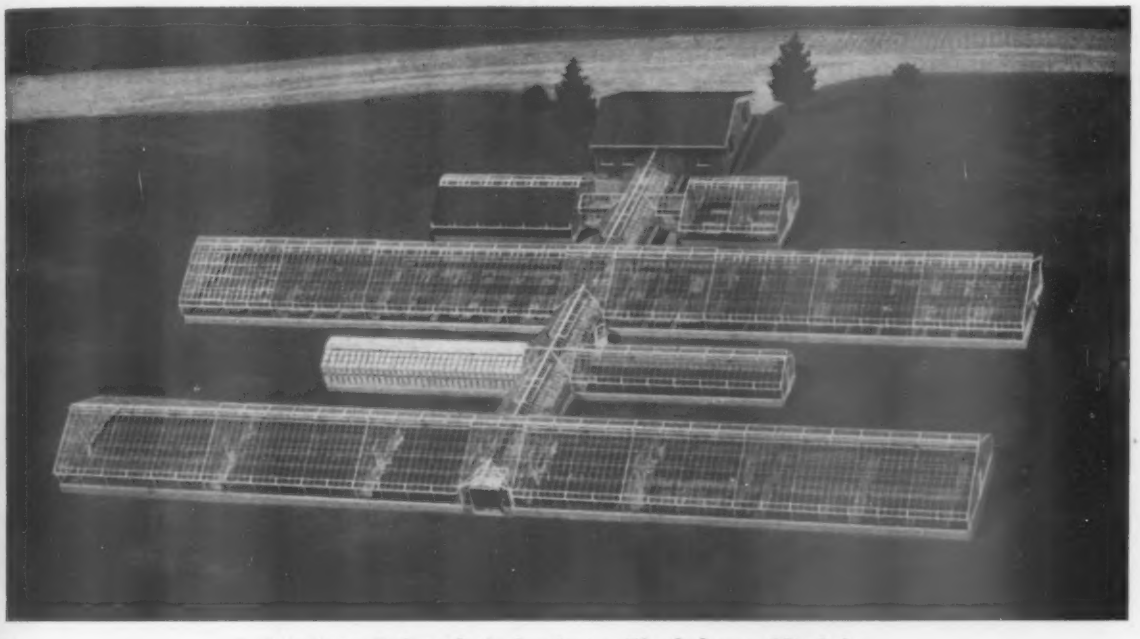
LORD & BURNHAM

Irvington, New York

Des Plaines, Ill. St. Catharines, Ont.

EVERYTHING IN GLASS STRUCTURES FOR SCHOOLS AND UNIVERSITIES

Greenhouses and Conservatories Since 1856



Virginia Polytechnic Institute, Blacksburg, Virginia

Walter Kelsey, Architect — Lord & Burnham, Contractors

A most up-to-date greenhouse range for educational purposes and plant research in the southern states, and one of the most outstanding ones in the country. The complete job was designed and built at one time.

Call on us for anything you need in greenhouses or other glass structures for educational purposes. We have a special University and School Department to cooperate with you on plans, specifications, and quotations.

Lord & Burnham

Irvington, New York — Des Plaines, Ill.

St. Catharines, Ont.

Greenhouses since 1856

A Few of Many Universities For Whom We Have Built

Michigan State University—East Lansing, Mich.
Cornell University—Ithaca, N. Y.
University of Notre Dame, South Bend, Ind.
University of Vermont, Burlington, Vt.
University of Connecticut—Storrs, Conn.
University of Georgia—Athens, Ga.
Purdue University—Lafayette, Ind.
Ohio State University—Columbus, Ohio
Pennsylvania State College—State College, Pa.
Colorado A & M College—Ft. Collins, Colo.
U. S. Dept. of Agriculture—Beltsville, Md.
Vassar College—Poughkeepsie, N. Y.
University of California—Riverside, Calif.
Stellenbosch-Elsenburg College—South Africa
Duke University—Durham, N. C.

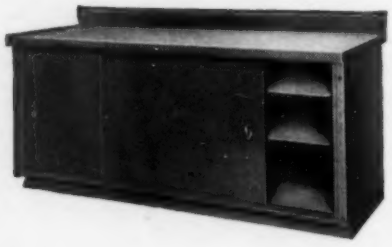
Oldest and Largest Greenhouse Builders in America

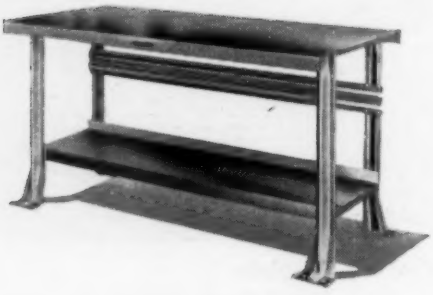
STANDARD PRESSED STEEL CO.

Jenkintown 15, Pennsylvania

HALLOWELL® SHOP EQUIPMENT OF STEEL

Standardized, ready-made Work Benches, Shop Desks, Tool Stands, Posture Stools and Chairs, Cabinets.









STEEL STOOL
Strong, welded construction. Heights from 18" to 30". Also adjustable models.



LABORATORY or DRAFTSMAN'S STOOL
Heights from 17" to 27". 4" screw adjustment. With or without footrest.

HALLOWELL Work Benches can be used as individual or continuous units, require no bolting to the floor, are easily installed and maintained.

HALLOWELL CABINET BENCHES

Standard Lengths: 4', 5' and 6'. **Standard Top Materials:** steel, Presdwood, laminated wood. **Standard Heights:** steel top—35¼"; Presdwood top—35 7/16"; laminated wood top (1¾" thick)—35", (2⅝" thick)—35⅞". **Standard Widths:** steel and Presdwood—23½" and 29", laminated wood—24" and 30".

Steel tops widely used as "paint and stain" or "glue" benches. Wood tops ideal for machine shop work. Benches have fully enclosed bases and close-fitting sliding doors for safe storage of paint, shellac and other flammable materials. Doors are fitted with cylinder lock.

HALLOWELL STANDARD BENCHES

Standard Lengths: 3', 4', 5' and 6'. **Standard Top Materials:** steel, Presdwood, laminated wood. **Standard Leg Heights:** 29", 31¼" and 33½". **Standard Widths:** 23½", 29" and 36".

Wood tops widely used for "woodworking" and as "vise benches." Steel tops frequently specified as "soldering benches," but equally adaptable to a wide variety of general shop uses. Standard drawer tier units, storage cabinets and other accessories also available.

HALLOWELL MULTIPLE UNIT BENCHES

Standard Lengths: 5' and 6'. **Standard Top Materials:** steel, Presdwood, laminated wood. **Standard Heights:** 31¼" and 33½", depending on base used. **Standard Widths:** nominally 24" and 30".

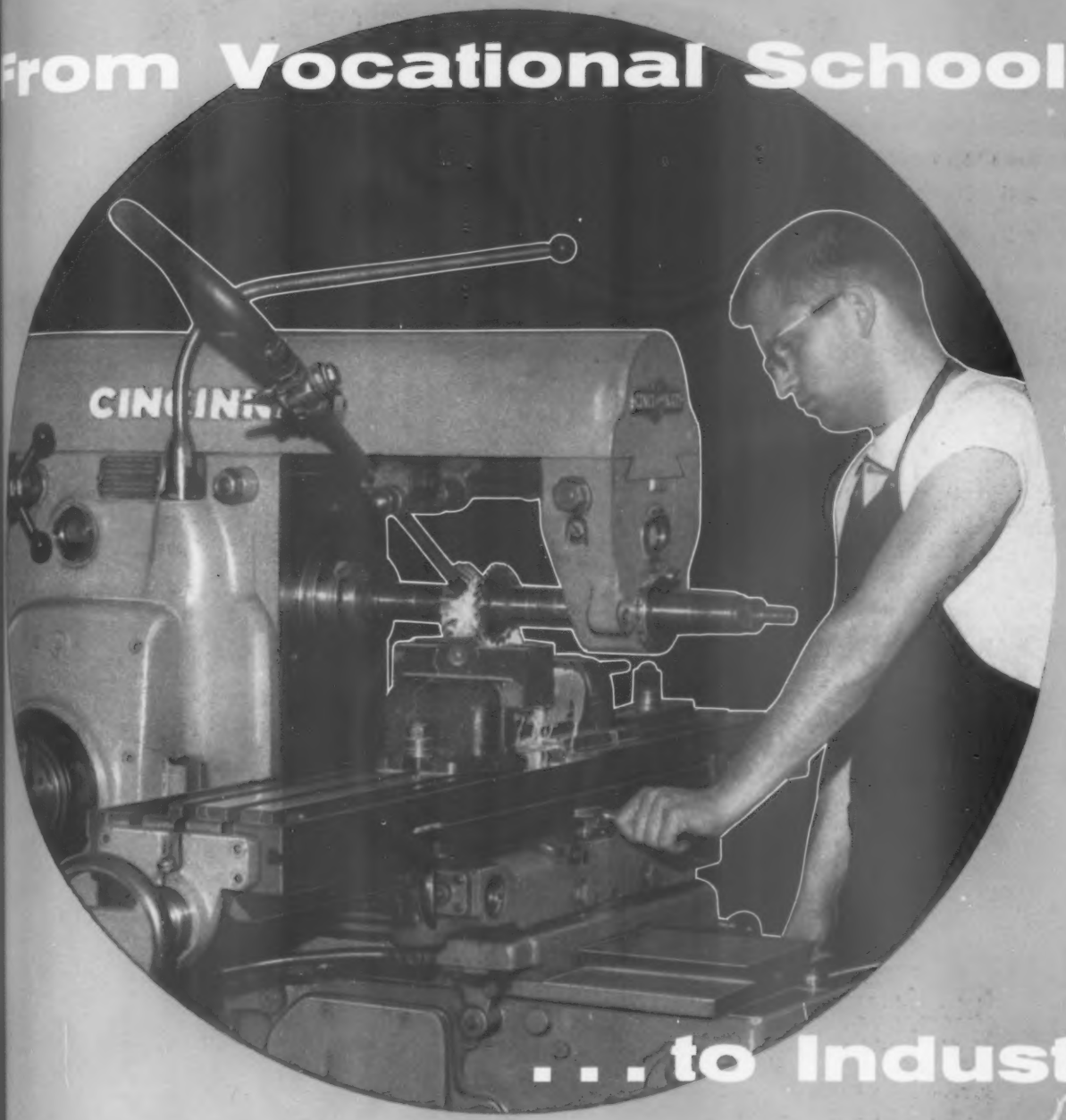
Storage space is built into the bench, encourages better housekeeping, neater shops. Tools and supplies can be stored conveniently in either cabinets or drawers. Models are available with 2 cabinets, 2 drawer tiers or 1 drawer tier and 1 cabinet.



CARRY TOOL
The handier tool stand. (Also fully enclosed portable tool cabinets.)

Bulletins 701, 702 and 841 contain complete information on HALLOWELL Benches. Other items of HALLOWELL Shop Equipment are described in other literature.

From Vocational School



. . . to Industry

the transition is easier for students trained on CINCINNATIS

HE CINCINNATI MILLING MACHINE CO.
INCINNATI GRINDERS INCORPORATED

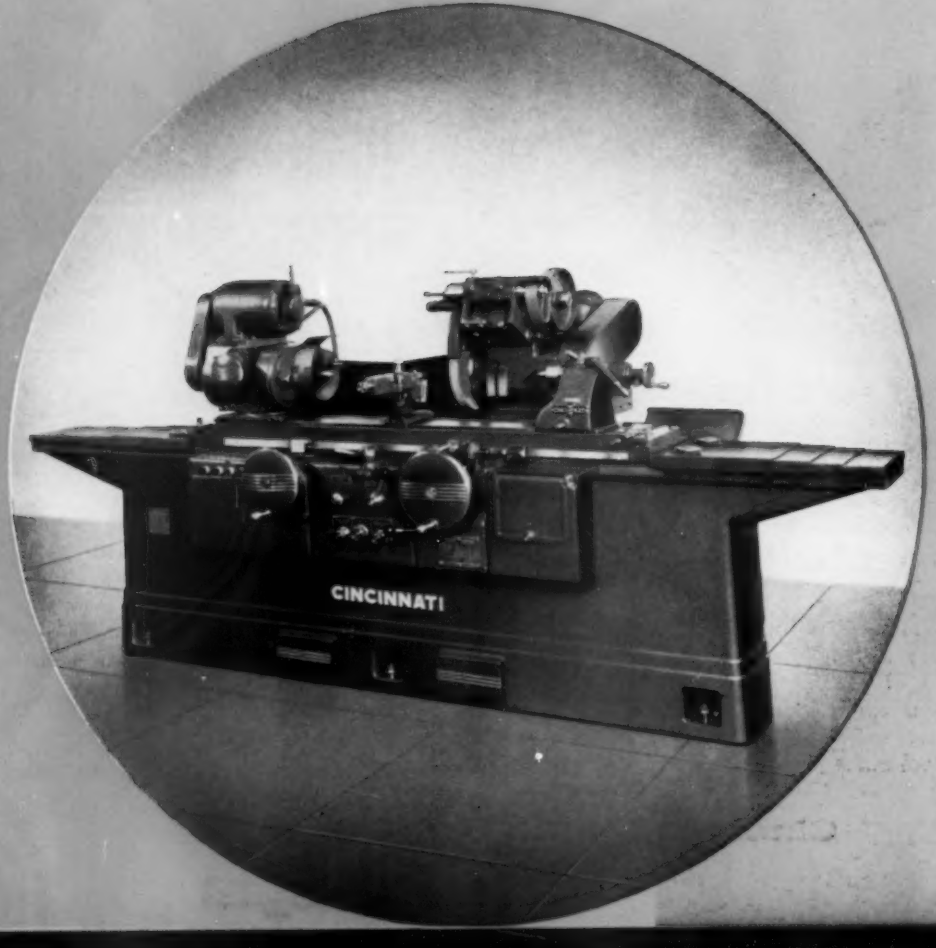
Cincinnati 9, Ohio

Everyone does better work and produces more when he feels at home on the job. And the way to be sure that your machine shop boys will feel at home on their first job is to train them on machines built primarily for industry. Four Cincinnati machine tools, developed for industry and highly desirable for school shops, are illustrated here. All of them are easy and safe to operate; all are nationally accepted by industry; all are priced within most school budgets; all are designed with features of versatility which permit the teacher to demonstrate a wide variety of setups.



Toolmaster Milling Machine

For light milling operations within 1 hp range. Lowest priced in the Cincinnati line. Variety of attachments available. Catalog No. M-1870-2.



12" Hydraulic Universal Grinder

A precision cylindrical grinding machine for both external and internal work, including taper, face and angle grinding setups. Many attachments available. Catalog No. G-486-7.



No. 2 ML Milling Machine

An accurate, versatile and easy-to-operate machine. Universal style (with Dividing Head) illustrated. Plain style also available. Three-way power feed is standard equipment; 28" table traverse; 3 hp drive. Many attachments available, including vertical head, rotary milling tables, slotting head, etc. Catalog No. M-1662-2.



No. 1 Cutter and Tool Grinder

For sharpening all the milling cutters, circular saws, reamers and similar cutting tools used in school shops. Also an ideal machine for other grinding operations that can be handled dry. Numerous attachments available. Catalog No. M-1852.

Give your machine shop boys a faster start in reaching the higher pay brackets in industry; train them on machines built by Cincinnati Milling. May we tell you more about these fine machine tools? You can obtain preliminary information by writing for the catalogs in which you are interested.

CINCINNATI

Cincinnati Training Aids for School Shop Programs

Three types of training aids by Cincinnati Milling may be obtained for your machine shop lecture courses. They are available to instructors at no charge, except quantities of educational booklets, which are nominally priced. The more popular training aids are tabulated here. However, others are available, and if you would like to have a complete list, write to Technical and Service Publications Dept. and ask for our leaflet "Educational Aids." Please confine your request to the items of immediate interest.



EDUCATIONAL BOOKLETS

These booklets contain a wealth of basic and practical information for machine shop instructors. No charge for single copies.

Milling Machine Practice . . . No. M-773-1
Cutting Gear Teeth . . . . . No. M-1769
Look Sharp at Your Cutters . No. M-1657-3
Principles of Centerless Grinding . . . . No. G-503-2
Explaining the Centerless Principle with the Aid of a Wood Model . . . No. G-509



INSTRUCTION CHARTS

Suitable for framing, or may be attached to the wall with adhesive tape. 22" x 34" in size. Principal units and operating controls are indicated. The following charts are desirable for lecture courses:

- Toolmaster Milling Machine
- Nos. 2ML and 2MI Milling Machines
- No. 1 Cutter and Tool Grinder
- 12" Hydraulic Universal Grinder



THREE 16MM COLOR MOVIES

"Highway to Production"
"Age of Precision"
"Cool Chips"

Technically these three movies are not training aids, but they are widely shown and highly informative. They give the students a greater appreciation of the machine tool and metalworking industries. Write for booking dates.

CINCINNATI

CINCINNATI

THE CINCINNATI MILLING MACHINE CO.
CINCINNATI GRINDERS INCORPORATED

F—3/St

STACOR

FLEX-MASTER



A CO-ORDINATED LINE OF LIFETIME STEEL DRAWING & DRAFTING TABLES FOR SCHOOLS

for
art classes
engineering
mechanical drawing
vocational & industrial arts

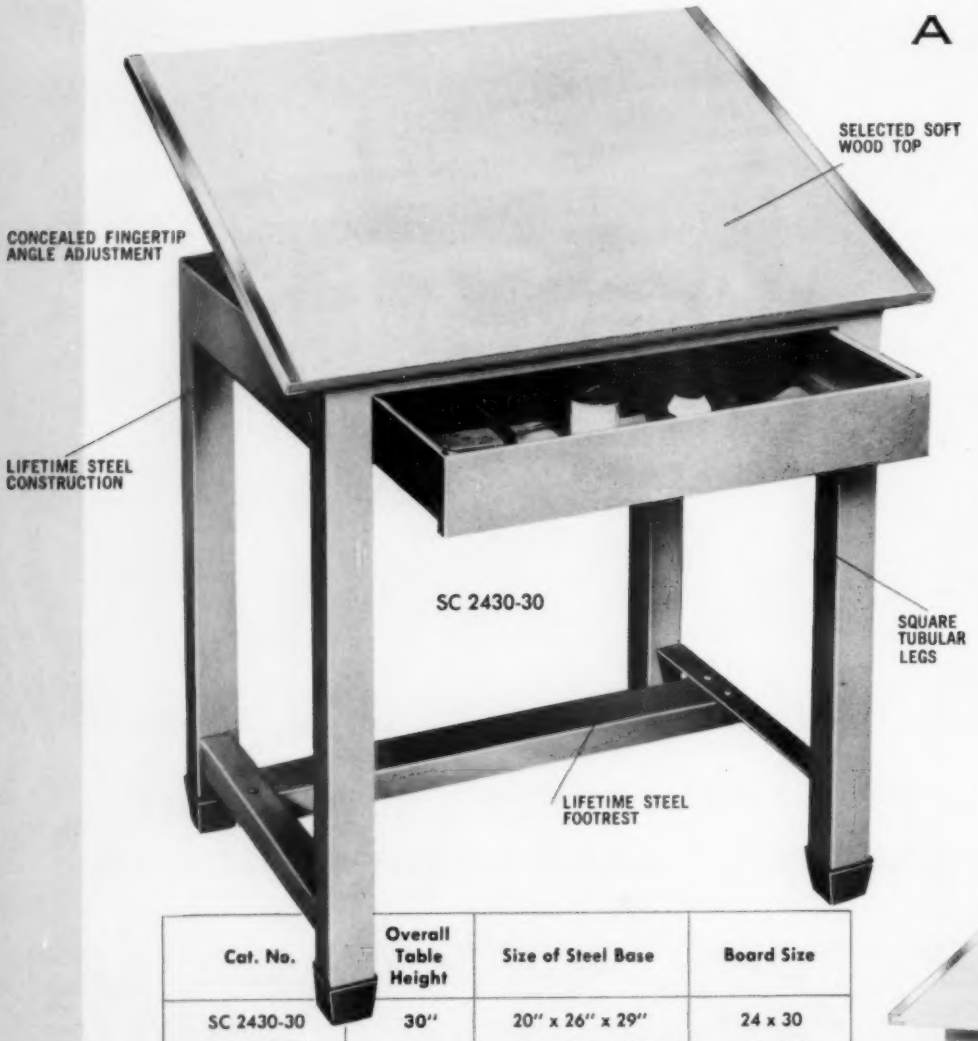


CATALOG #755—PTD. IN U.S.A.

STACOR

FLEX-MASTER

A LIFETIME O



- New adjusting device permits fingertip adjustment of board to any desired working angle — no exposed knobs or parts that can be tampered with
- Large, all-steel drawer allows ample room for papers, bottles, tools, etc.
- Lifetime steel construction
- Selected soft wood top
- Hard baked Grey Hammertone enamel finish
- Shipped K.D.—easy to assemble
- Steel tubular legs fitted with smooth bottom shoes

THESE MODELS ALSO AVAILABLE WITH STEEL TOPS OR HARDWOOD TOPS

THESE TABLES FORM PART OF THE MANY COMBINATIONS DESCRIBED ON THE FOLLOWING PAGES

ALL BOARDS EQUIPPED WITH ZINC PLATED STEEL END CLEATS

DRAWERS OPERATE SMOOTHLY ON NYLON GLIDES

Front steel pencil ledges for all tables furnished upon request at no extra cost.

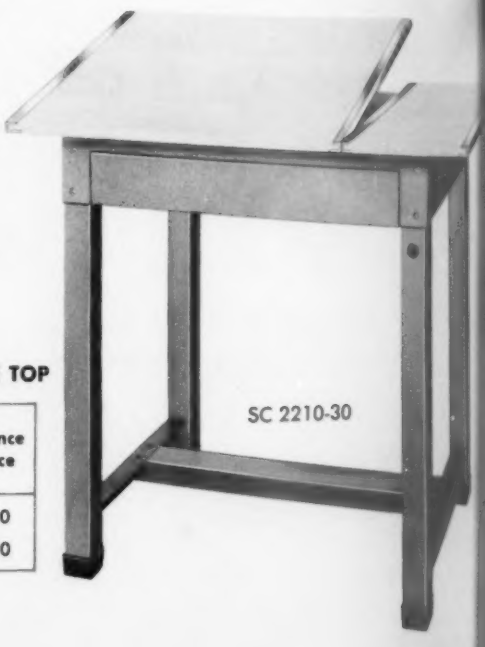
Cat. No.	Overall Table Height	Size of Steel Base	Board Size
SC 2430-30	30"	20" x 26" x 29"	24 x 30
SC 2430-37	37"	20" x 26" x 36"	24 x 30
SC 2436-30	30"	20" x 26" x 29"	24 x 36
SC 2436-37	37"	20" x 26" x 36"	24 x 36

DRAWER SIZE — 20½" x 14" x 3"

FLEX-MASTER DRAWING TABLE WITH REFERENCE TOP

Cat. No.	Overall Table Height	Size of Steel Base	Drawing Surface	Reference Surface
SC 2210-30	30"	20 x 26 x 29	22 x 24	22 x 10
SC 2210-37	37"	20 x 26 x 36	22 x 24	22 x 10

DRAWER SIZE — 20½" x 14" x 3"



IFETIME STEEL DRAWING TABLES

ERVICEABILITY



Two Lifetime Steel adjusting devices which slide into rear table legs. Allows board adjustment to any desired working angle. Large, all steel drawer allows ample room for papers, bottles, tools, etc. Lifetime steel construction. Selected soft wood top. Hard baked Hammertone grey enamel finish. Shipped K. D. Easy to assemble. Steel tubular legs fitted with smooth bottom shoes.

THESE MODELS ALSO AVAILABLE WITH STEEL TOPS

ALL BOARDS EQUIPPED WITH ZINC PLATED STEEL END CLEATS

DRAWERS OPERATE SMOOTHLY ON NYLON GLIDES

Cat. No.	Overall Table Height	Size of Steel Base	Board Size
SC 3142-30	30"	28 x 38 x 29	31 x 42
SC 3142-37	37"	28 x 38 x 36	31 x 42
SC 3648-30	30"	28 x 38 x 29	36 x 48
SC 3648-37	37"	28 x 38 x 36	36 x 48

DRAWER SIZE — 20½" x 14" x 3"



FLEX-MASTER DRAWING TABLE WITH REFERENCE TOP

Cat. No.	Overall Table Height	Size of Steel Base	Drawing Surface	Reference Surface
SC 3310-30	30"	28 x 38 x 29	31 x 33	31 x 10
SC 3310-37	37"	28 x 38 x 36	31 x 33	31 x 10

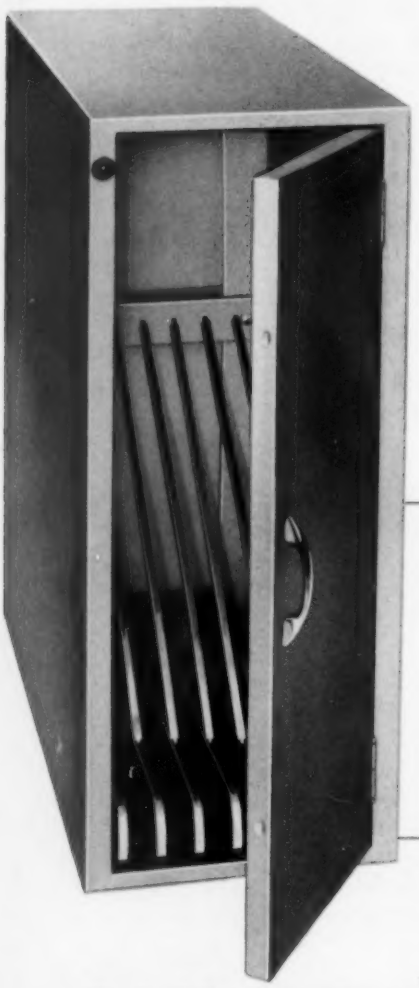
DRAWER SIZE — 20½" x 14" x 3"

STACOR

FLEX-MASTER

ALL STEEL 6 STUDENT BOARD STORAGE CABINET AND TOOL CABINET





T 6920
6 drawer unit. Contains 6 tool drawers equipped with individual locks & master-keyed. Heavy gauge steel construction. Smooth sliding drawers. Overall size 11¼" x 24½" x 27½". Drawer size 9" x 20" x 3½".

DB 2026
Board Storage unit. Will hold 6 drawing boards up to 20"x26". Heavy gauge steel construction. Double wall door. Overall size 11¼" x 24½" x 27½".

S 2069
Heavy gauge steel base for DB 2026 and T 6920. Overall size 11¼" x 24½" x 8½".



The flexibility of these Flex-Master units permits a wide range of combinations most suited to the particular needs of each classroom.

The T 6920 six drawer tool cabinet or the DB 2026 Board Storage unit can be placed alongside the SC 2430-30 or the SC 2436-30 or the SC 2210-30 and can serve as a reference top as illustrated on page 5. The base unit S 2069 provides the additional height needed to use the above cabinets with the 37" high tables.

6 STUDENT DRAWING TABLES



31-DM 42

All steel 6 student Drawing Table. A quality product built for lifetime use.

STACOR all steel Board Storage unit #DB 2026 and Stacor all steel 6 drawer Tool Cabinet #T 6920 combine with the SC 3142-37 or the SC 3648-37 Drawing Table to make a unit of unequalled durability, compactness and attractive appearance. Top is of selected soft wood. Hard baked Hammertone grey finish. Shipped K.D. Easy to assemble.

ALSO AVAILABLE WITH STEEL TOP

ALL BOARDS EQUIPPED WITH ZINC PLATED STEEL END CLEATS

DRAWERS OPERATE SMOOTHLY ON NYLON GLIDES

Front steel pencil ledges for all tables furnished upon request at no extra cost.

Cat. No.	Overall Height	Board Size
31 DM 42	37"	31 x 42
36 DM 48	37"	36 x 48

UTILITY DRAWER SIZE – 20½" x 14" x 3"



This illustration shows SC 2430-30 table with 6 drawer unit #T 6920.



Illustration above shows SC 3142-37 with Board Storage Cabinet #DB 2026. The 6 drawer Tool Cabinet #T 6920 can also be used in the same manner.

STACOR

FLEX-MASTER

6 STUDENT DRAWING TABLE ASSEMBLY

A lifetime steel Mechanical Drawing Table of the finest quality. Especially designed for school use: The board storage cabinet #DB 2026 and the 6 drawer cabinet #T 6920, each mounted on a Base #S 2069, form an extremely sturdy and practical base for the adjustable selected soft wood drawing surface. Also available with steel top. Finished in hard baked hammertone grey. Shipped K.D. Easy to assemble.

ALL BOARDS EQUIPPED WITH ZINC PLATED STEEL END CLEATS

DRAWERS OPERATE SMOOTHLY ON NYLON GLIDES

Front steel pencil ledges for all tables furnished upon request at no extra cost.



Cat. No.	Overall Height	Board Size
MD 4231-29	29"	31 x 42
MD 4231-37	37"	31 x 42

#MD 4231-29 is the same unit except that Base #S 2069 is not required.



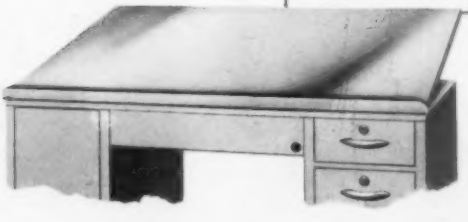
Stacor Flex-Master 6 Student Drawing Table Assembly with Reference Top.

Cat. No.	Overall Height	Drawing Surface	Reference Surface
MD 3310-29	29"	31 x 33	31 x 10
MD 3310-37	37"	31 x 33	31 x 10

This is the same unit as the MD 4231-37 with an adjustable drawing top and a fixed reference surface. Also available with steel tops.

Stacor Flex-Master Steel Top Table. Same as MD 4231-37— except that top is all steel.

Cat. No.	Overall Height	Steel Top Size
MD 4231-29S	29"	31 x 42
MD 4231-37S	37"	31 x 42



MD 4231-37S

WORK BENCH LOCKER BASES

...ous Stacor quality that meets highest standards in ...ign and efficiency. Heavy gauge lifetime steel all ...ded construction for durability.

...ree types to meet the needs of the school shop. Cata... #W2136 is the standard six student locker base. ...talog #W2112 will provide additional lockers as ...eded. For larger projects ample room is provided in ...talog #DW3621.

...lors: Green or Hammertone Grey.



W2136



W2112

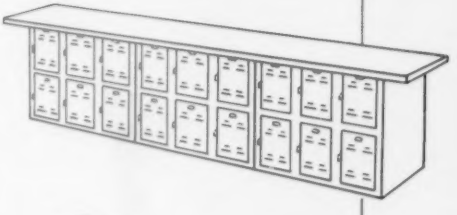
SIMPLIFIED MOUNTING

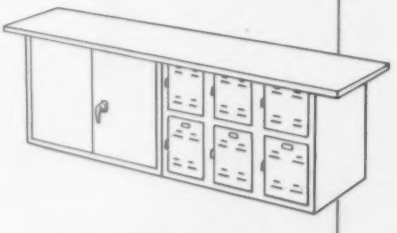
Heavy angles are provided to mount work bench tops. Pre-punched holes are provided for bolting two or more units together.

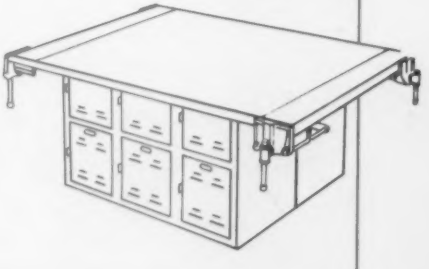
Same overall measurements permit combinations #W2136 and #DW3621.

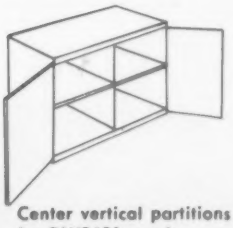
#W2136 and #W2212 have heavy steel spring hinges to keep doors closed automatically. Hasps are provided for padlocks.

Catalog #DW3621 is equipped with lock handle and two keys.









Center vertical partitions for DW3621 can be furnished as extras.



DW3621

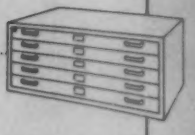
Cat. No.	Description	Overall Size D W H	Compartment Size D W H
W2136	6 compartments	21 x 36 x 30	20⅞ x 11 15/16 x 14⅜
W2112	2 compartments	21 x 12 x 30	20⅞ x 11 15/16 x 14⅜
DW3621	2 doors, 1 shelf	21 x 36 x 30	20 13/16 x 35¾ x 14⅜

for *all* your needs . . . there is an efficiently-planned quality product of

STACOR LIFETIME STEEL

STAKMASTER 4 & 5 DRAWER FLAT FILES

Heavy gauge steel welded to form, smooth rolling ball bearing drawers, precision built.



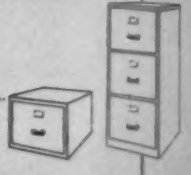
STEEL BASE 4-POST DRAFTMASTER DRAFTING TABLE

Four-post steel base, Kiln-dried soft wood top. Easily adjusted to any working angle. 4 sizes.



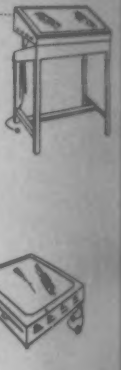
X-RAY FILING CABINETS

1 and 3 drawer X-ray filing cabinets; progressive cradle suspension.



FLUORESCENT 4-POST TRACEMASTER TRACING TABLE

Smooth glass working surface with scientifically designed reflector . . . shows up details clearly even on old prints. Adjustable working angles—Underwriters listed electrical parts.



LIFETIME STEEL TABORET

Heavy gauge steel welded to form, two drawers, large cabinet section with door. Recessed base or casters.



LIFETIME STEEL PORTABLE TRACING BOARD

Can be used flat or at an incline. 2 movable fluorescent lamps, switch and extra long cord. Underwriters listed electrical parts.



STACOR STEEL AUXILIARY UNIT

For Draftmaster Drafting Table. All steel cabinet fits under Tool Drawer or Drafting Table, offering added room for tools, ink bottles, filing letters, etc.





write for our General Catalog #554

STACOR EQUIPMENT CO

768-778 EAST NEW YORK AVENUE, BROOKLYN 3, NEW YORK

TOLCO
THE TOLERTON COMPANY
Alliance, Ohio

PRECISION BUILT

INDUSTRIAL ARTS EQUIPMENT

The Tolerton Company has specialized in the manufacture of precision built wood products since 1894. Every manufacturing operation from the forest to packing case is carefully controlled by forestry experts and skilled craftsmen. The Tolco line of Industrial Arts Equipment represents years of research and development so that we can furnish schools with the best possible equipment at the lowest possible prices. Superior construction and materials give every piece of Tolco equipment a long, trouble free service life.



1.



2.

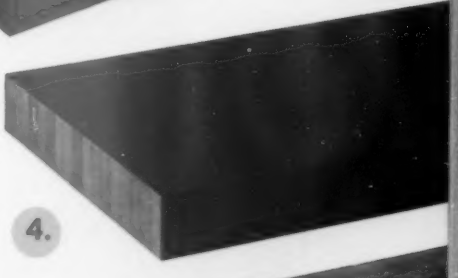
1. **MODEL T-316** General Shop Bench. Complete with Tolco top, stake plate, angle iron on front and back edges. Top 2¼" x 48" x 96".
2. **MODEL TA-2** Two Student Art Table with two tilting tops and stationary center section. Large storage cabinet and drawer.
3. **MODEL TM-12** Four Student Bench with 12 heavy gauge lockers and Tolco top 2¼" x 54" x 64".
4. **TOLCO ACID RESISTANT TOP** A standard Tolco top treated with multiple coats of chemical resistant materials. Full range of sizes.
5. **TOLCO TOP** Edge grained Northern, hard maple. Narrow laminations electronically glued. Available from 1¼" to 4" thick, full range of widths and lengths.
6. **WALL ASSEMBLY UNITS** Metal Locker Base Units—utilizes wall space. Tolco tops manufactured to fit each installation. Illustration shows 4 base units.
7. **MORGAN VISES** Complete range of types and sizes for every school requirement.



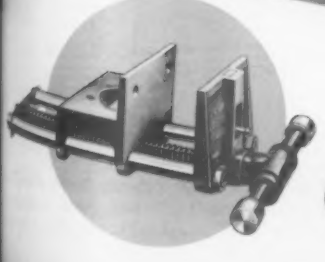
3.

6.

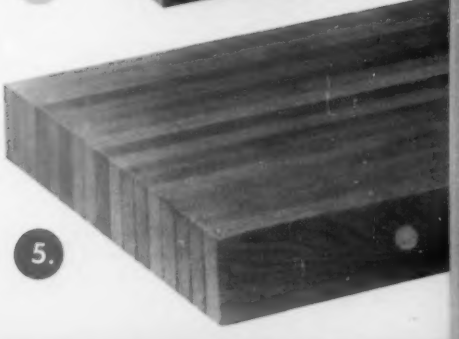




4.



7.



5.

PRECISION BUILT

INDUSTRIAL ARTS EQUIPMENT

The first electronic gluing equipment used in the woodworking industry was developed in the Tolco mills. The process was first used to fabricate critical wooden parts for the aircraft industry and later it was used to glue maple laminations to form Tolco tops. Our research work indicated that a critical control of the gluing operation was necessary to control moisture absorption during the glue drying cycle. Electronic gluing made such control possible resulting in a top that was less susceptible to warpage and twist. To secure a 100% glue bond in every glue area research indicated that electronic gluing in itself was not the complete answer. Maple laminations in excess of ¾" were too rigid for proper gluing pressure. Narrow ¾" laminations together with electronic gluing provide a top that we found superior in every test. Tolco equipment is furnished with a top using only ¾" laminations and electronic gluing.



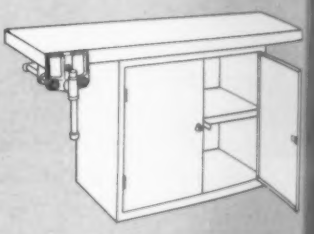
MODEL T-1 An open frame, single student bench with 1 drawer. MODEL T-O without drawer. Top 2¼" x 22" x 52".



MODEL T-2 Open frame 2 student bench with drawer on each side. Several variations of this model available. Top 2¼" x 36" x 52".



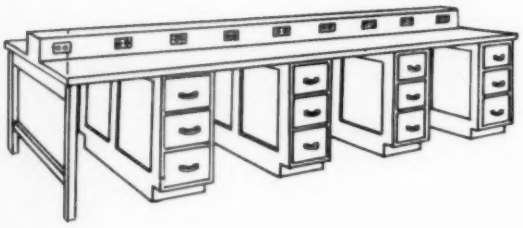
MODEL TV-14 Two Student Machinists' Bench with flat surfaced Tolco Top. Seven drawers on each side. Top 2¼" x 36" x 52".



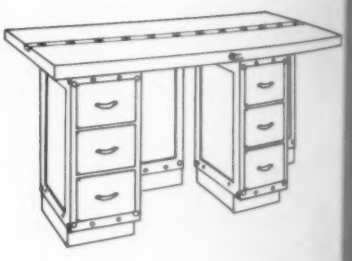
MODEL TM-4 Metal Based Bench for either one or two students. Single 4 compartment base. Top 2¼" x 27" x 64".



MODEL T-10 Two Student Bench all wood construction. Five drawers on each side. Top 2¼" x 36" x 52".



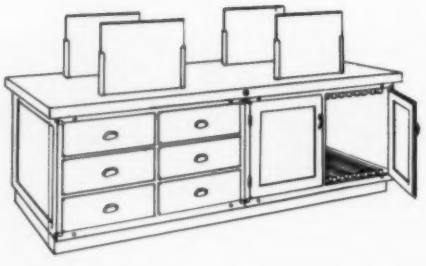
MODEL T-314 Electrical Bench. All hard maple construction. 18 duplex receptacles in wiring tunnel. Top 2¼" x 54" x 144".



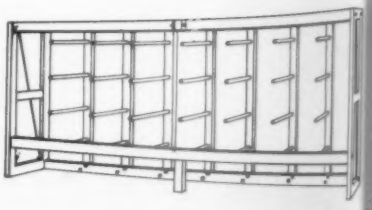
MODEL TE-72 Electrical Bench designed for limited budgets. Six drawers each side with wire strip down center of top. Top 2¼" x 48" x 72".



MODEL T-14 Two Student Bench —wood construction. Seven drawers on each side. Top 2¼" x 36" x 52".



MODEL T-312 Wiring Bench, complete with removable wiring boards, electrical receptacles, drawers and storage cabinet. Top 2¼" x 48" x 96".



MODEL T-530 Lumber Rack. Hard maple frame with 1¼" iron pipe lumber supports. 22" deep, 6' high, 13' long.



MODEL T-326 Soldering Bench. Hard maple frame with asbestos covered plywood top. Top 1⅛" x 24" x 60".



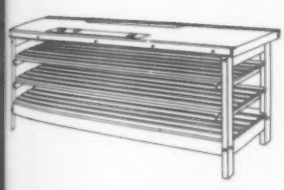
MODEL TGS-60 Glue and Stain Table with hard maple frame. Tolco laminated top covered with galvanized steel. Top 1¼" x 24" x 60".



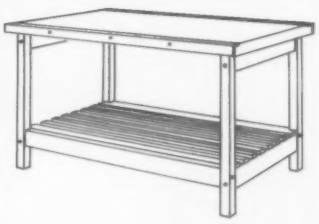
MODEL TC-37 Clay Storage Cabinet. Waterproof plywood construction with galvanized steel lining.



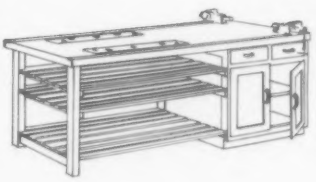
MODEL TMB Moulders Sand Hopper. Hard wood construction with galvanized lining.



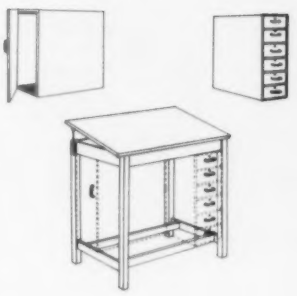
MODEL TSB-96-3 Sheet Metal Bench. Hard maple, Tolco top with stake plates and angle iron edges. Top 2¼" x 40" x 96".



MODEL TSB-60-1 Sheet Metal or Machine Shop Bench. Angle iron edges on Tolco Top. Top 2¼" x 40" x 60".



MODEL T-316-A General Shop Bench—Large Storage area. Tolco top with stake plates and angle iron. Top 2¼" x 48" x 96".



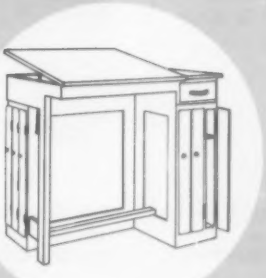
MODEL T-620 Drafting Table with hard maple frame. Board storage and drawer cabinets available.



MODEL T-703 Drawing Table. Maple frame, birch plywood top, one drawer.



MODEL TA-60 Art Table. Maple frame, birch plywood top with metal edge band. Top ¾" x 42" x 60".



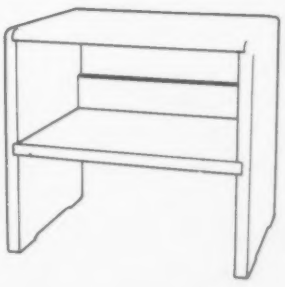
MODEL TD-6 Drafting or Art Table—Maple frame, 6 board storage cabinet. Various tops available.



MODEL TEC Economy Drawing Table. Hardwood construction—Adjustable top available.



MODEL TAH Art Bench. Hard maple construction. Overall length 29" height 33".



MODEL TAB Art Student Bench. Sizes 17" x 12" x 17" or 17" x 12" x 26".



MODEL 30 Utility Stool—one of several models of hardwood Tolco stools.



TOLCO LOCKS Furnished as regular combination or combination with master control key.



MODEL TWD Drafting or Art Table with fully adjustable top. Hard maple construction. One large drawer and board storage cabinet.



MODEL TM-8 Four Student Bench with metal base. Each side has two door, four compartment storage area. Top 2¼" x 54" x 64".



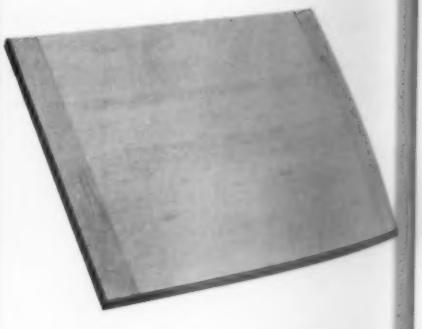
MODEL TW-0 Four Student Bench with open maple frame base. Ideal for the school that has adequate storage facilities.



MODEL TK-2 Two Student Kindergarten Table. All hard maple with laminated top and shelf. One student model available.



MODEL TS-48 Tool Storage Cabinet. Maple frame with birch panels. Two rotating tool panels. Very sturdy construction.



BASSWOOD DRAWING BOARDS Made in a complete range of sizes from select basswood.



The major items in the Tolco line are shown in this leaflet. Space limitations prevent showing several adaptations of some models. However, our regular catalog gives complete information, large illustrations and dimensional drawings of all models. Special models can be built to your own specifications.

Write today for your copy of the complete Tolco catalog.

TOLCO
THE TOLERTON COMPANY
Alliance, Ohio

THE TOLERTON COMPANY

265 North Freedom Avenue **ALLIANCE, OHIO**

GREENLEE TOOL CO.

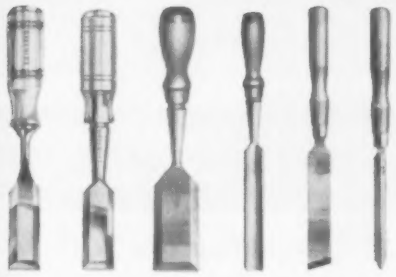
DIVISION OF GREENLEE BROS. & CO.

1716 Columbia Avenue, Rockford, Ill.



better shopwork with fine hand tools by GREENLEE

Good workmanship is taught far easier with high-quality tools. Students learn faster . . . get the "feel" of true craftsmanship. And *good* tools mean real economy . . . they last longer, keep edges better, cut down on material spoilage, and help produce finer finished work. That's why it pays to equip with GREENLEE fine hand tools. All are carefully formed and finished for accuracy and correct cutting edges . . . all are properly heat-treated for long life. They are made *by* craftsmen *for* craftsmen!



CHISELS, GOUGES, TURNING TOOLS

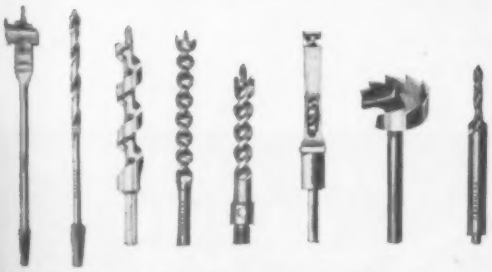
Various types of tang butt, socket butt, and firmer chisels with durable green plastic or hickory handles. Outside and inside bevel socket gouges. Short and full-length turning tools.



GREENLEE 22 SOLID-CENTER AUGER BITS

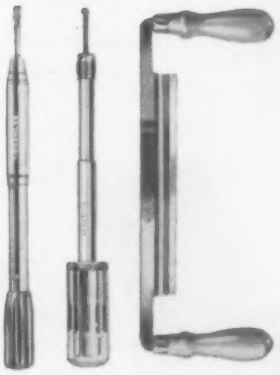
Made with utmost care to assure free, easy boring and fast chip clearance. Solid-center design for extra strength, smooth operation. Accurately sized, perfect cutting edges. "Plastic-Sealed" to reach you factory-sharp. Can be purchased singly or in sets . . . in plastic rolls, steel boxes, or handy bench sets as shown below.





EXPANSIVE BITS, DRILLS, ELECTRIC-DRILL BITS, MORTISING AND BORING TOOLS

Fast, easy-boring expansive bits with positive chip clearance. Wood-boring brace drills and solid-center electric-drill bits in various sizes. Long-lived tools for woodworking machines: machine bits, hollow chisels, multi-spur bits and others.



SPIRAL SCREWDRIVERS, PUSH DRILLS, DRAWKNIVES

Free-running, fast-action GREENLEE spiral screw drivers available in two models: Enclosed Spiral for extra safety and Open Spiral. Automatic push drills are smooth operating with automatic spring return. Drawknives are light in weight and have sturdy, rigid blades.

TOOLS FOR CRAFTSMEN

GREENLEE



FREE CATALOG describes in detail above illustrated GREENLEE tools and others including bit extensions, electricians' auger bits, augers, and many more. Write for Catalog 35-H.

THE LUFKIN RULE CO.

HOME OFFICE and FACTORY — SAGINAW, MICHIGAN

BRANCH OFFICES — 132-138 Lafayette St., New York City • Barrie, Ontario



NO. 1941
MICROMETER



NO. 34V
MANUAL TRAINING
BENCH RULE



NO. 62
MANUAL TRAINING
STEEL RULE



NO. 525
COMBINATION
SQUARE SET

Make YOUR teaching easier with these LUFKIN Training Aids

WALL CHARTS

1. TOOL WALL CHART.
Attractive 7-color chart on heavy fiber board. 31 inches wide, 36 inches high. Basic metalworking tools are beautifully illustrated. A permanent, instructive, and attractive display for your classroom.

2. "HOW TO READ A MICROMETER" WALL CHART.
Interesting illustrated wall chart explains the subject in concrete terms. 22 inches wide, 17½ inches high.

3. DECIMAL EQUIVALENT WALL CHART.
Gives decimal equivalents of fractions of an inch, number size drills, and letter size drills. 24 inches wide, 37 inches high.

4. MICROMETER SECTIONAL WALL CHARTS.
Cut-away view of micrometer with directions for adjusting on one side, and decimal equivalents of fractions of an inch on other side. 8½ inches wide, 11 inches high.

OTHER AIDS

1. "MICROMETER READING MADE EASY."
Interesting 12-page booklet is cleverly illustrated in cartoon style. Tells how to read to both thousandths and ten-thousandths of an inch. How to care for and adjust a micrometer.

2. "THE AMAZING STORY OF MEASUREMENT."
20-page four-color booklet traces the history of measurement from pre-historic times to the present. Interesting cartoon style.

3. "TIME SAVERS."
Circular slide rule type. Gives size of tap, threads per inch, size of tap drill, and decimal equivalents.

4. "DRILL CARDS."
Gives decimal equivalents of parts of an inch on one side, and decimal equivalents of number size drills on the other side.

296

Write Today to THE LUFKIN RULE CO., DEPT. S.E., SAGINAW, MICHIGAN for your training aids. *Be sure to specify quantity. No charge, of course.*

For accuracy in your school shop . . . "Better Measure with Lufkin"

Manufacturers of . . .

PRECISION TOOLS
Micrometers
Squares, Combination
Calipers
Dividers
Steel Scales
Indicators
Protractors
Bevels
V Blocks
Clamps
Hold Downs
Scribers
Rules, Steel
Punches, Center and Drive Pin
Tool Sets
Levels
Wigglers
Steel Beam Trammels

GAGES
Center
Depth
Drill Grinding
Feeler
Planer
Radius
Screw Pitch
Shaper
Surface
Telescoping
Thickness
Height
Dial Indicator

MEASURING TAPES
Chrome Clad Steel
Nubian Finish Steel
Stainless Steel
Engineers Steel
Surveyors Chain
Metallic and Other Woven Types
Pocket Steel and Woven
Hi-Line Non-Metallic Woven
Ni-Clad Steel

STEEL TAPE-RULES
Chrome Clad
Nickel Plated
Stainless Steel

RULES
"Red End" and Other Spring Joint Extension
Aluminum Folding
Boxwood and Caliper
Board and Log
Steel and Brass
Manual Training



NO. 41
OUTSIDE CALIPER



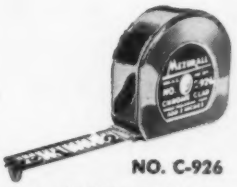
NO. 399
DIAL INDICATOR



SEND FOR
GENERAL CATALOG



NO. X46F
"RED END"
EXTENSION RULE



NO. C-926
CHROME CLAD
MEZURALL TAPE RULE



NO. 1 TOOL SET

MILLERS FALLS COMPANY

Dept. AU-1, Greenfield, Massachusetts

Outstanding Tools for Woodworking, Machine Shop, Building, Repair and Maintenance

For years Millers Falls tools have been the first choice of many American Schools and Universities. Today they offer you the finest line in 86 years of toolmaking — hand tools with superb, modern styling and many unique features . . . electric tools packed with power and efficiency . . . cost-cutting hack saw blades for every purpose . . . time-tested machinists and precision tools of guaranteed accuracy. For value and performance, craftsmen the world over know it's hard to beat Millers Falls modern, rugged line of top quality tools.



WORLD FAMOUS PLANES AND BIT BRACES

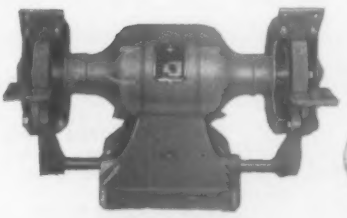




HAND, BREAST AND AUTOMATIC DRILLS

CARPENTERS' AND MASONS LEVELS





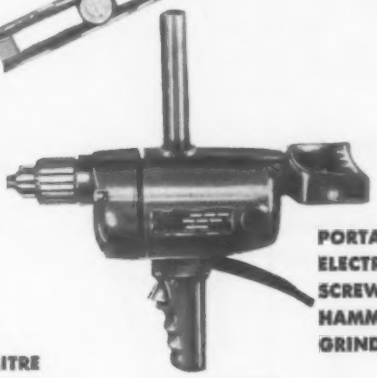
BENCH GRINDERS



HACKSAW FRAMES



SCREWDRIVERS ALL TYPES

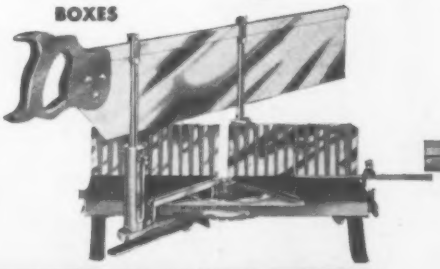


PORTABLE ELECTRIC DRILLS, SCREWDRIVERS, HAMMERS, GRINDERS, SANDERS

MICROMETERS AND PRECISION TOOLS



MITRE BOXES





COMBINATION SQUARES



HAND AND POWER HACKSAW BLADES

MILLERS FALLS TOOLS
SINCE 1868 ®

The Mark of Superiority

FREE CATALOG

Our general catalog—illustrating and describing the complete Millers Falls line of hand tools, power workshop tools, precision and machinists' tools —will be sent on request. Address: Millers Falls Company, Dept. AU-1, Greenfield, Mass.



STANLEY TOOLS

Educational Department, 154 Elm Street, New Britain, Conn.



Get your copy of STANLEY TOOL CATALOG No. 34



NEW school index helps in specifying tools for your shop

Includes complete lines of Stanley and "Yankee" Tools and Russell Jennings Bits.

. . . Tools for every school shop

FOR WOODWORKING and FARM SHOPS
The most complete line offered by one manufacturer.

FOR ELECTRICAL SHOPS
Hammers, bit braces, bit extensions, screw drivers, etc.

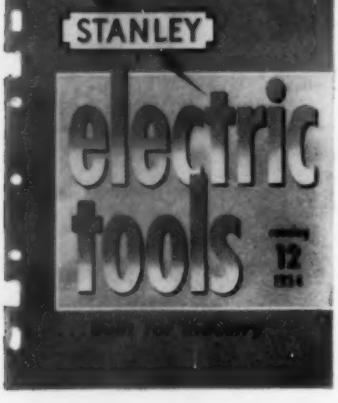
FOR SHEET METAL SHOPS
Hammers, chisels, punches, etc.

FOR AUTOMOBILE SHOPS
Hammers, chisels, punches, screw drivers, etc.

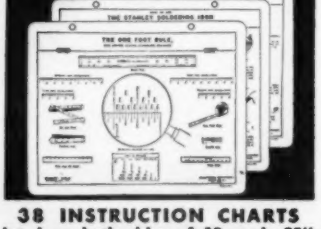
FOR MACHINE SHOPS
Hammers, rules, chisels, punches, levels, etc.

FOR FORGE SHOPS
Anvil tools, tongs, hammers, etc.

ALL SOLD THROUGH LEADING HARDWARE DISTRIBUTORS EVERYWHERE



Get your copy of Stanley Electric Tool Catalog No. 12. Drills, Grinders, Routers, Planes, Shapers, Portable Saws, Shears, Eye Shields, Hammers, Screw Drivers.



38 INSTRUCTION CHARTS
Printed on both sides of 19 cards 25" x 19" — $6.00 per set postpaid in U.S.A.



36 SAFETY CHARTS
Printed on both sides of 18 cards 18" x 12" — $3.50 per set postpaid in U.S.A.

FILM STRIPS AND OTHER TEACHING AIDS AVAILABLE AT COST. WRITE FOR LITERATURE.

Educational Dept., Stanley Tools,
155 Elm St., New Britain, Conn.

THE TOOL BOX OF THE WORLD

STANLEY

Reg. U.S. Pat. Off.

HARDWARE • TOOLS • ELECTRIC TOOLS • STEEL STRAPPING • STEEL

THE L. S. STARRETT COMPANY

World's Greatest Toolmakers

Athol, Massachusetts, U. S. A.

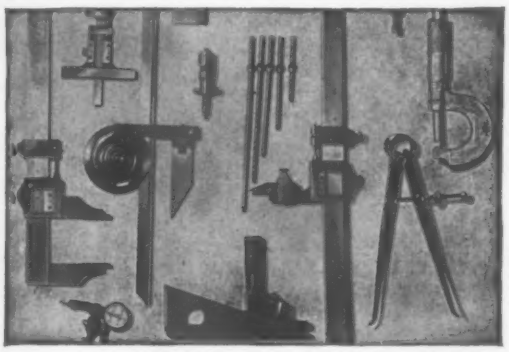
NEW YORK
53 Park Place

Standard of Precision

CHICAGO
17 N. Jefferson Street

MECHANIC'S HAND MEASURING TOOLS AND PRECISION INSTRUMENTS • DIAL INDICATORS • STEEL TAPES • HACKSAWS, BAND SAWS AND BAND KNIVES

Your tool dealer can show you a complete line of Starrett Tools for school shop use priced to fit your budget. For complete information, write for Starrett Catalog 26A-SU.

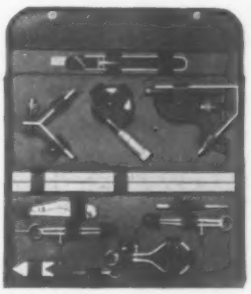


STARRETT PRECISION MEASURING TOOLS

The fine workmanship and lasting accuracy that have made Starrett Tools the choice of skilled machinists have also made them standard school shop equipment. The complete STARRETT line includes a wide selection of Micrometers, Verniers, Calipers, Gages, Protractors, Squares and other mechanics' hand measuring tools and Precision Instruments.

STARRETT No. 902-B SET OF TOOLS

The essential measuring tools for modern class projects. Includes 1" micrometer, combination square with center head and 12" blade, center gage, center punch, 6" flexible steel rule in pocket case, 4" inside caliper, 4" outside caliper and 4" hermaphrodite caliper—all conveniently yet securely arranged in a compact folding case.





STARRETT STEEL TAPES AND RULES

STARRETT Steel Tapes are made for every purpose in lengths and graduated to suit every requirement. STARRETT Steel Rules are standard for accuracy, easy to read, made to suit every need or preference.



STARRETT HACKSAWS

STARRETT Hacksaw Blades cut faster and last longer. There is a STARRETT Hacksaw for every job—S-M High Speed Steel hand and power blades, High Speed Steel hand and power blades, "Safe-Flex" High Speed Welded Edge power blades, "Safe-Flex" hand blades and Starrett Standard all hard, flexible back and "Semi-Flex" hand blades.



STARRETT BAND SAWS FOR METAL, WOOD AND PLASTICS

STARRETT hard edge flexible back Metal Cutting Band Saws are available in 10 widths, 3 gauges and 8 pitches, in coils of any length or cut to length and welded. STARRETT "Skip-Tooth" Band Saws are available for fast cutting of magnesium, aluminum and other non-ferrous metals, also for wood, plastics and special compositions.



STARRETT EDUCATIONAL BLUE PRINT SETS

A valuable and practical instruction aid on the use of precision tools. The Set consists of fourteen blue-printed 8" x 10½" punched sheets, each illustrating an important tool and its uses. Furnished to instructors and students at cost—20 cents per set.



THE STARRETT BOOK *for* STUDENT MACHINISTS

A handy source of information student machinists must have about tools, machines and modern methods. Prepared in cooperation with leading vocational experts, it is written in simple shop language, contains more than 200 illustrations and 30 useful reference tables. Available through your local Starrett Tool distributor at $1.00 a copy. Descriptive Folder furnished on request.

ATLAS PRESS COMPANY

5312 North Pitcher St., Kalamazoo, Mich.

Atlas and CLAUSING PRECISION TOOLS Meet School needs best!

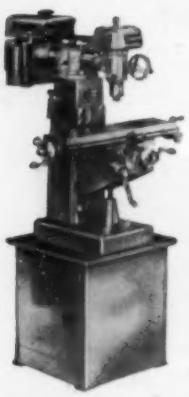
There are many reasons why ATLAS and CLAUSING machine tools meet school needs best. They set the standard for safety. Each has many exclusive easy-operating features that enable students to learn machining principles *faster* . . . and with less supervision.

They're ruggedly built to stand up under inexpert student use — their quality construction will win commendation from those who expect you to buy tools for many years of accurate service.

And they enable you to buy more equipment per dollar invested, to give more students the opportunity to get adequate operational experience.

When you plan for shop expansion or tool replacement, make sure you have the latest ATLAS-CLAUSING catalogs as a guide in determining your recommendations and requisitions.

CLAUSING VERTICAL MILL



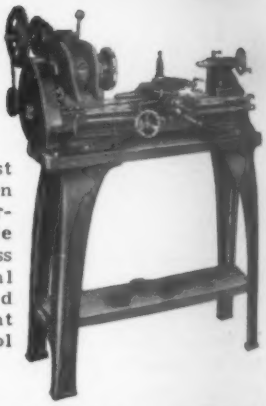
Mills, drills, bores, reams and shapes — at all angles — with one work setup! 6" x 24" table, high precision spindle head, 3" quill travel, six speeds — 180 to 3250 R.P.M.

CLAUSING 6300 LATHES



Has fully enclosed headstock, outboard drive, quick-change mechanism and automatic apron. 1⅜" bore — 1" collet capacity — "Zero-Precision" Timken tapered roller bearings — No. 3 MT tailstock with tang socket — 12¾" swing over bed, 7½" over saddle. 24" — 36" — 48" between centers.

ATLAS 10" LATHES



The only low-cost lathes with Timken tapered roller bearings. 16 spindle speeds; power cross and longitudinal feeds standard equipment. Great value for school shops.

ATLAS 7" SHAPERS



The only compact shapers with all the sturdy construction and operating features of large shapers, built down to size. Timken tapered roller bearings. Crank type ram drive. 4 speeds, 5 automatic cross feeds.

CLAUSING 18" DRILL PRESS

New, heavy-duty drill with many exclusive features for broad and thorough instruction. Drills to center of 18¼" circle. Capacity, ¾" in steel, 1" in cast iron — 6½" spindle travel.



ATLAS DRILL PRESSES

15" floor and bench models include new operating and durability features. 4-ball bearing "floating drive" for long accuracy life. Extra heavy head, table, column, base. New depth control stop. 12¾" bench size also available.





SAFETY SAM SAYS:

SEND FOR CATALOGS, WALL CHARTS AND SAFETY POSTERS

ATLAS PRESS COMPANY

5312 North Pitcher St., Kalamazoo, Mich.

America's Safest and most Practical Woodworking Tools!

10" SAW



Cuts 3¼" deep: 20" x 27½" table, precision-ground. 12" right of blade. 13" ahead — Extensions available. Quick-positioning fence, with vernier control.

NEW ATLAS 14" JIG SAW



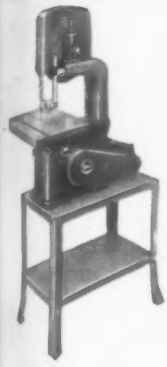
Every part designed to minimize vibration and assure smooth, clean, accurate cuts. New appearance and efficiency. Four speeds for wood, metal, plastic, etc. 24" throat capacity . . . cuts 2¼" deep. 14" x 14" table tilts 45° right. 15° left, swivels 90°. Blade turns 90°. Removable arm. Complete splash lubrication. Scientifically balanced mechanism. Exclusive spring steel hold-down.

NEW 8" and 10" SAWS



More rugged, easier to handle, quieter, smoother, and more accurate. NEW clear vision, tenite safety guard . . . modern structural design . . . larger arbor and sealed-for-life ball bearings . . . dual V-belt drive . . . push-pull dual blade control . . . grip-form miter gauge . . . big easy-to-read tilt/arbor gauge . . . pyramid design stands. Famous ATLAS lift-off fence with vernier control.

12" BAND SAW



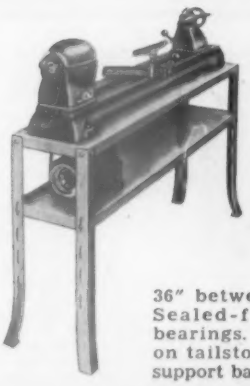
Ideal size for school shops. 14" x 14" precision-ground table tilts 45°. Cuts stock to 6¼" thick. Ball bearing wheels and blade supports.

SPINDLE SHAPER



15" x 21" precision-ground table. Table adjusts vertically, stationary spindle for smoother cutting. Ball bearings.

12" WOOD LATHE



36" between centers. Sealed-for-life ball bearings. Lever locks on tailstock and tool support base. 4 speeds.

BELT AND DISC SANDER



Sands any width boards, angles, curves, metals, plastics. 10" disc, 4" belt, table tilts 45°. Ball bearings.

6" JOINTER



42" long precision-ground table. 32" x 4½" tilting fence supported close to cutter head. Sealed-for-life ball bearings.

SEE YOUR Atlas DEALER

When you examine the solid construction and test the easy, accurate operation of these new ATLAS tools — you'll know why more and more vocational education leaders are specifying ATLAS. Your nearby ATLAS dealer will be glad to show them to you. Write today for his name.



Atlas SCHOOL SHOP PLANNING GUIDE

Complete up-to-date information covering all phases of school shop planning for most effective teaching and learning — by Dr. John L. Feirer of Western Michigan College of Education.

ONLY 50¢

BOICE-CRANE COMPANY

1375 Central Avenue, Toledo 6, Ohio

AMERICA'S MOST IMITATED POWER TOOLS—FOR 40 YEARS

Power Tools Designed with the School Shop in Mind

- ★ **FLEXIBLE—Readily adaptable to a wide range of projects.**
- ★ **SAFETY ENGINEERED—As nearly 100% safe as modern devices permit.**
- ★ **RUGGED—Will take a beating that would incapacitate most machines.**
- ★ **PRACTICAL SIZE—Just right for efficient school shop layout.**

PLANNERS AND ARCHITECTS!
Write for free 52-page power tool catalog,
a valuable reference book for your files.



THE NEW MASTER-MONOTROL
(Pat. Applied For)

The First Machine Tool Engineered 10-INCH TILTING ARBOR SAW

Safe, practical and fool-proof! First 10-inch saw to offer motors up to 2 H. P. Cuts plumb square, rips stock super straight, and cuts miters that really fit! Extra rugged. Permanent accuracy even with abusive use. Adjusts for any cut at the front with a *single* control. Safer—blade tilts to left, *away* from the hand commonly used to feed. A new, rigid, "all purpose," steel insert eliminates any need for a second one and constant interchange shifting from sawing to dadoing. With extensions the top affords a work area of 36" x 27½".

For Real Safety When Jointing Long Stock



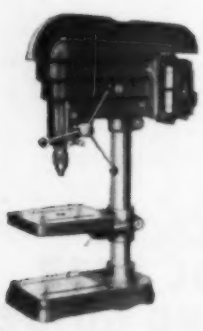
BOICE-CRANE 8" WELDED, ALL-STEEL LONG TABLE JOINTER

The *only* jointer offering the numerous advantages of ground steel tables 84" long, plus welded box construction that eliminates unsupported table overhangs. A general purpose jointer indispensible where stock exceeds 8 ft. in length. Planes up to 16" wide. Strength, permanent accuracy and alignment impossible with bolted-up cast-iron construction. Entire infeed table is a rabbet arm, so narrow rabbeting on wide stock is as easy as any other. Guard always stays on the machine—even when rabbetting. Quick, positive, micrometer-accurate knife setting for perfect finish, without chattermarks. 3¼" dia. head. Improved cutting angle. Depth of cut, ⅝". Speeds up to 5500 r.p.m. Boice-Crane also offers 6" x 60" steel and 6" x 36" cast-iron jointers.

BOICE-CRANE 12" x 4" THICKNESS PLANER



No large planer, at any price, planes stock smoother, or power feeds stock only 6½" long without butting, as will the Boice-Crane. Nor can large planers match its ability to plane as thin as ⅛ inch without tearing. Main frame cast in one piece, NOT BOLTED UP, guarantees such performance permanently! Feeds up to 17 f.p.m. by power, dependably, without servicing, thanks to its ingenious, trouble-free feed mechanism. Choice of super-safe direct connected motors or V-belt drives. Successfully combines the production rate of low priced planers designed only for thicknessing building lumber, and the ability to produce the blemish-free surface necessary for fine cabinet finish.



25% EXTRA CAPACITY FROM 15" DRILL PRESSES

Boice-Crane HEAVY-DUTY Helmet Heads are ⅝"—not just ½" capacity. 50% thicker (stiffer) column for closer precision at the chuck. 20% larger quill and deeper head reduces wear from side thrust. 6-tooth involute splined drive. 5 speeds. Far more sensitive. 56 high and low speed, bench and floor models. 1-2-3-4 spindles. We urge those whose needs are met by a 15-inch drill press in the low price range to compare Boice-Crane Challengers with other drill presses in their price range. Same range of speeds and models as Helmet Heads. Attachments for mortising, routing, shaping, and tapping.

THE MOST RUGGED OF ALL 14" BAND SAWS

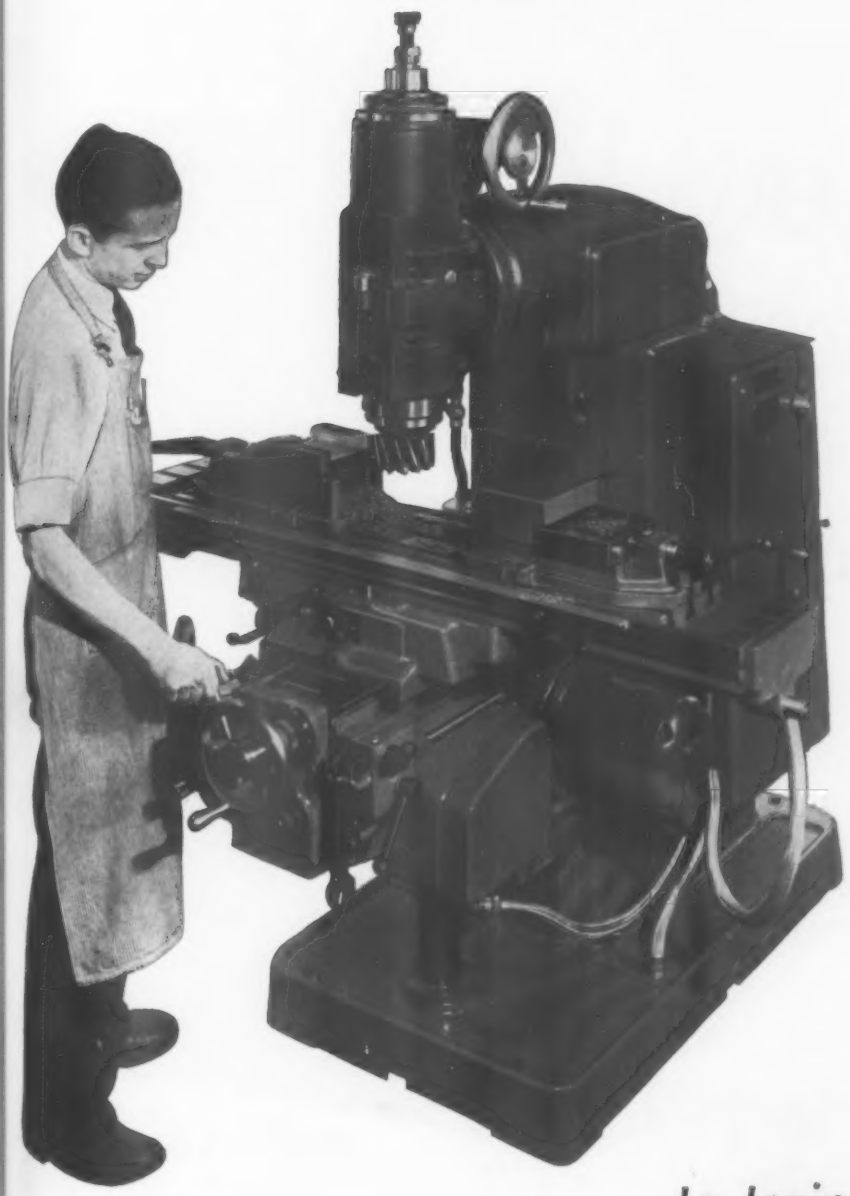


Cuts, files, sands, grinds any material. 1-speed models for wood and 8-speed models for general and metal shops—12 models in all. Welded one-piece steel frame like giant 36-inch industrial bandsaws, takes abusive service. Wheels and blade entirely sealed, right to the cutting point. Blade guides safe to adjust even when running by single control. High blade speed of 4100 f.p.m. cuts hard woods like butter; bans hazardous choking in the cut; cuts 2 to 4 times *smoother*, too; reduces sanding by half or more! Choose super-safe direct drives, or V-belt. Sealed-in-steel motor-drive compartment—safer, and dust free! Under guide capacity: 7¾". Blades: ⅛", ¼", ⅜", ½" and ¾", 98" circumference. Table 15" x 15½" tilts 45° R., 10° L. on two trunnions. 13½" blade to guard, cuts 27" dia. Wheels are strong, but light, 14" dia. Grease-sealed ball bearings. Height, floor model: 67".



BROWN & SHARPE MFG. CO.

Providence 1, R. I., U. S. A.



HIGH PRECISION machines and tools

... to train shop students in modern production methods

Designed to fulfill today's industrial demands for production of consistently accurate work, Brown & Sharpe Machine Tools, Machinists' Tools and Shop Equipment permit you to train shop students in best modern practices.

Throughout metal-working shops the world over, Brown & Sharpe products are known for quality.

B·S

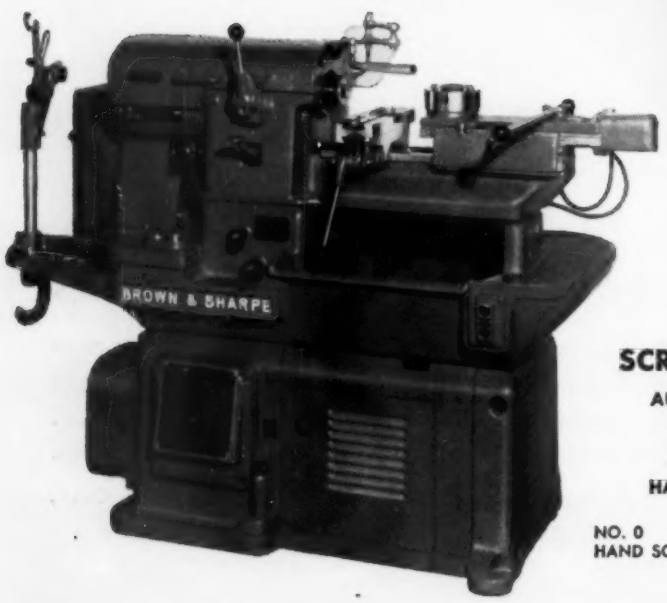
Brown & Sharpe

AMERICAN SCHOOL AND UNIVERSITY—1955–56

MODERN DESIGN machines for objective training



NEW NO. 1
UNIVERSAL GRINDING
MACHINE



NO. 0
HAND SCREW MACHINE

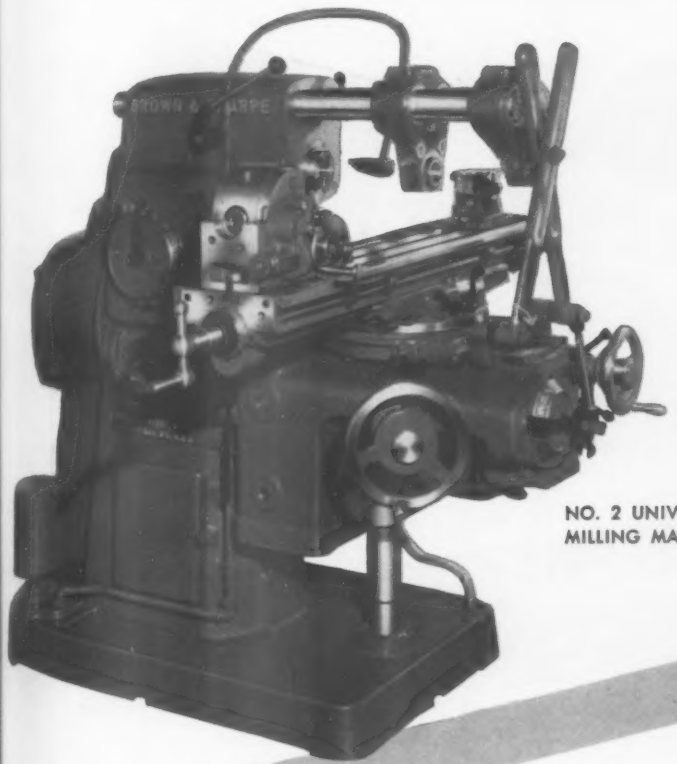
GRINDING MACHINES

UNIVERSAL
PLAIN
SURFACE
CUTTER AND TOOL

SCREW MACHINES

AUTOMATIC (including screw threading, pinion turning, and cutting-off types)
HAND SCREW

BROWN & SHARPE MFG. CO.



NO. 2 UNIVERSAL
MILLING MACHINE, 3 H.P.

MILLING MACHINES

OMNIVERSAL
UNIVERSAL
PLAIN (including manufacturing type)
VERTICAL

BECAUSE BROWN & SHARPE MACHINE TOOLS are used so universally in metal-working plants, immediate openings are more apt to be available to the graduate who has learned on these machines.

You not only train, but also help to "job fit" your shop students when you equip your department with these machines designed for simplified operation, high accuracy and versatility.

Write for detailed information on any of the machines listed here. Brown & Sharpe Mfg. Co., Providence 1, R. I., U. S. A.

Brown & Sharpe BS

PRECISION TOOLS for practical training

Students trained in the use of Brown & Sharpe Machinists' Tools and Shop Equipment go into industry with the advantage of familiarity with professional tools famous for their accuracy, reliability and sound design.

The Brown & Sharpe line covers practically every requirement from micrometers to latest-type electronic measuring equipment. Write for details on any of the products listed here. Brown & Sharpe Mfg. Co., Providence 1, R. I., U. S. A.



Brown & Sharpe B·S

DURO METAL PRODUCTS COMPANY

2699 N. Kildare Avenue, Chicago 39, Ill.

A Rugged Precision Unit for Every Shop!

The New DURO 10" TILTING ARBOR SAW



New model performs multiple operations with new ease, accuracy and safety

The finest saw money can buy! Actually a whole workshop in one BIG unit at a comparatively SMALL price! You can do professional rabbeting, mortising, crosscutting, mitering, ripping, dadoing, sanding and countless other operations with an accuracy, ease and safety that students and teachers will appreciate. This new Duro 10" Tilting Arbor Saw incorporates the latest improvements, the finest precision workmanship and most advanced safety features.

For the modern shop, the school shop that's going to be around for many, many years—this new Duro 10" model is ideal. Whether you're building a completely new shop or just adding a unit, it will pay you to investigate the many exclusive features embodied in this outstanding saw. Check the specifications and see why the Duro 10" circular saw is best for your shop and your students.

Send for the New Duro Catalog

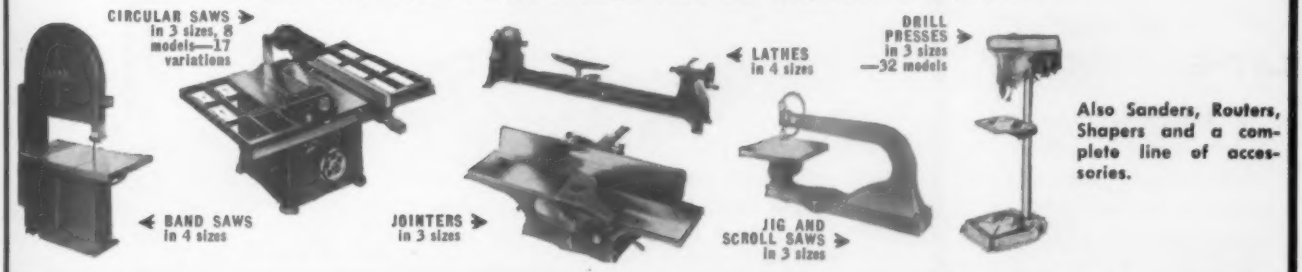
It's yours FREE. Contains full details and specifications on this remarkable 10" Saw. Also contains the complete Duro line of precision machines in many styles and models to suit every type of school budget. Write for your copy today.



Saw Specifications

Vertical depth of cut—3¼"; depth of cut at 45°—2-7/16"; table size—33" x 20"; with extensions 33" x 38"; spindle bearings—ball; distance ahead of blade—14¾"; max. distance blade to fence—25½"; dado head cap.—5" or 6"; overall size—height 44½", depth 43½", width 50". Weight 430 lbs.

THE DURO LINE OFFERS EVERY TOOL FOR THE MODERN SCHOOL SHOP

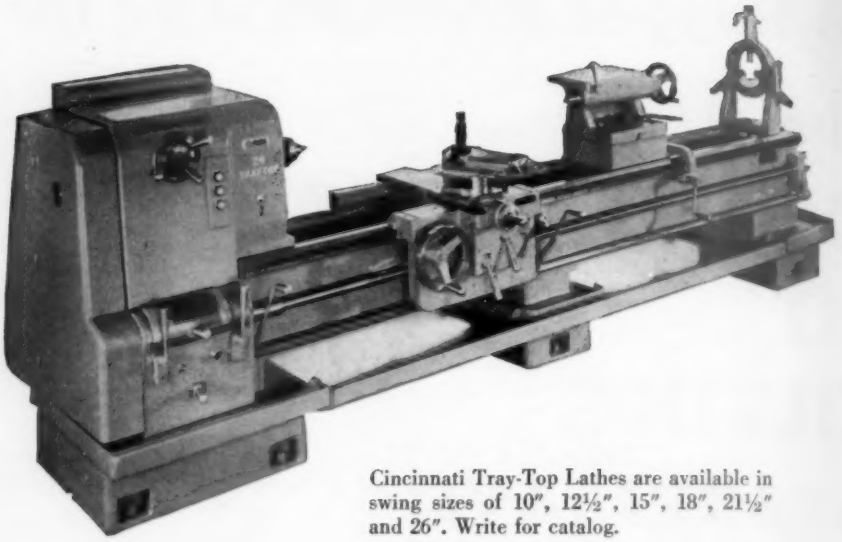


Also Sanders, Routers, Shapers and a complete line of accessories.

CINCINNATI LATHE AND TOOL CO.

Cincinnati 9, Ohio

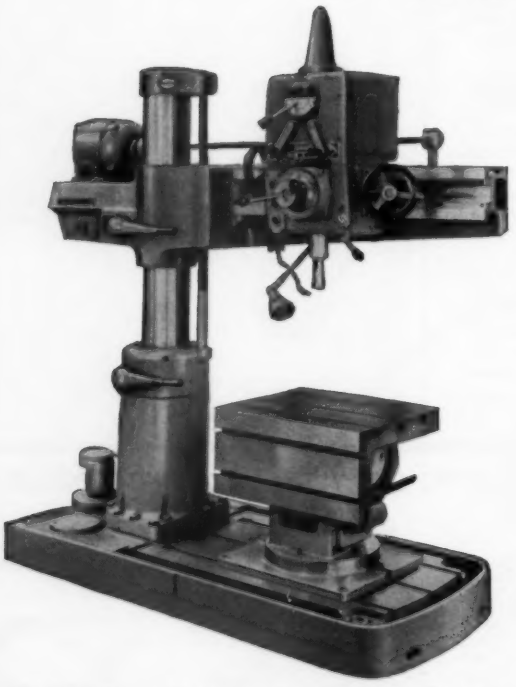
TRAIN THEM ON THE TOOLS INDUSTRY USES

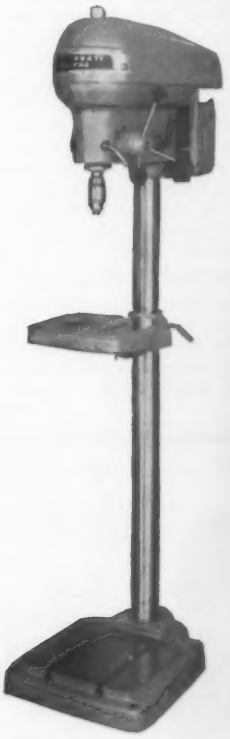


Cincinnati Tray-Top Lathes are available in swing sizes of 10″, 12½″, 15″, 18″, 21½″ and 26″. Write for catalog.

CINCINNATI

CINCINNATI

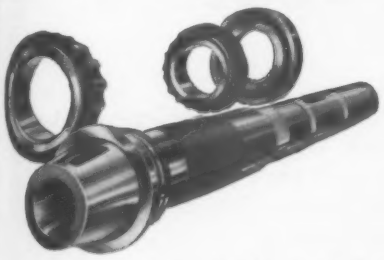




For details on Cincinnati Radial Drills, write for Catalog D-133; on Royal Drills, bench and floor models, write for Catalogs D-136 and D-134.

CINCINNATI
LATHE AND TOOL CO.

CINCINNATI 9, OHIO



Extra large, heat-treated, forged alloy steel spindles. Long, tapered key drive is accurate, durable, safe. One-piece, double-walled apron holds built-in oil reservoir. Spring-loaded safety clutch prevents overload damage.



CINCINNATI LATHES & DRILLS

- have all features needed for student instruction
- meet school budget requirements

ADAPTABLE to many operations on all common metals and plastics. 12 speeds, all geared, in geometric progression, 40-to-1 over-all ratio. 48 thread and feed changes. Top speeds to 1800 rpm.

EFFICIENT—simple, direct motor drive; minimum gear contacts; spindles mounted in 3 large antifriction bearings; fully enclosed quick-change gearbox.

CONVENIENT—Centralized controls; instant speed selection with 3-lever, direct-reading, "color-match" dial; start-stop spindle control at apron and quick-change gearbox.

DURABLE—Antifriction and Oilite bearings, amply lubricated, integrally splined shafts and spindle; Flamatic hardened gears in headstock, apron and quick-change gearbox; ground bedways.

SAFE—Feed stops if stray objects fall on drop levers; chucks and faceplates can't spin off; door to electrical panel cannot open until power is "off".

SPACE SAVING—"Tray-Tops" keep tools off carriage wings and ways; two cabinet legs provide storage space.

TRAY-TOP LATHES

ROYAL & RADIAL DRILLS



Royal spindle heads feature four sealed-for-life ball bearings, adjustable clock-type spring spindle return, adjustable depth gage.

- 3′ arm, 7½″ column, medium-duty radial
- light-duty, sensitive drills for metal or wood
- low-priced real machine tools

RADIAL DRILL—A fine production tool for radial drilling up to 1¼″—handles 90% of all drilling jobs. Low cost is combined with such high-priced features as: all-geared head with 9 spindle speeds; automatic pressure lubrication; all shafts mounted on antifriction bearings; flame-hardened and ground tubular steel column mounted on tapered roller bearings; trouble-proof column and arm clamps; hardened and ground head rail on arm; heavy ribbed base with built-in coolant tank.

ROYAL BENCH AND FLOOR DRILLS—16″ and 18″ models, built for sustained accuracy in long, hard usage. "Full floating" spindle drive. Spindle pulley mounted on two ball bearings to prevent belt pull being transmitted to the spindle. Two additional ball bearings carry radial and thrust loads. All four bearings have sealed-in lubrication; their ample size provides a wide safety margin for load and speed. Precision-ground alloy steel spindle has six integral splines. Vee type pulleys dynamically balanced for smooth performance. Exclusive hinged motor bracket provides fast, safe belt shifting without wrenches.

THE R. K. LeBLOND MACHINE TOOL CO.

DEPT. S
Cincinnati 8, Ohio

teach Big-Lathe practice on Machines with Big-Lathe Features

You can be sure you're teaching the latest in big-lathe practice when you use LeBlond Regals. This low-cost lathe with big-lathe features is a product of 63 years of machine tool experience, combined with the facilities of a plant which builds a complete line of 76 lathe models.

Geared Headstock—Power is transmitted efficiently from motor to spindle at eight conveniently-selected speeds.

Quick-Change Feed Box—56 feeds and threads can be chosen simply and quickly through this fool-proof mechanism.

Leadscrew and Feed Rod—*Both* are incorporated on the Regal to give you accurate thread-chasing and dependable feeds.

Taper Key Drive Spindle Nose—Safe, rugged and accurate positioning of chucks, faceplates and fixtures is assured in this big-lathe feature.

One-Piece Apron—Long-life sturdiness and protection from dirt and misalignment are built into the double-wall apron.

For complete information, write today to Dept. S.

Regals are built in 13-in., 15-in., 17-in., 19-in., 21-in. and 24-in. sizes and in a 13-in. bench size.



LeBlond 17" Regal Lathe

LeBLOND Regals

World's largest builder of a complete line of lathes.

THE R. K. LEBLOND MACHINE TOOL COMPANY
Cincinnati 8, Ohio

LOGAN ENGINEERING COMPANY

Lawrence and Lamon Avenue, Chicago 30, Illinois



12″ No. 2557-V

Quick Change Gear Lathe with Variable Speed Drive, 1″ Collet Capacity, 1⅜″ Spindle Hole, 35″ centers.



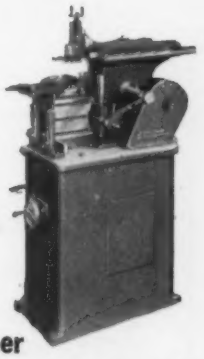
11″ No. 1920

Quick Change Gear Lathe, 1″ Collet Capacity, 1⅜″ Spindle Hole, 24″ and 36″ between centers, 16-speed V-belt drive.



10″ No. 1825

3-Drawer Cabinet Lathe, 24″ between centers, ½″ collet capacity, 16-speed V-belt drive.



Logan 8″ Shaper

Powerful 8½″ stroke, variable speed drive, 6 automatic feeds in either direction.

instructors teach more ... students learn more ... with

Logan LATHES and SHAPERS

The ease of Logan Lathe operation helps teacher and student clear the initial hurdle of learning to handle a lathe. Actual work projects are launched more quickly. Advanced students find Logan versatility, capacity and accuracy more than equal to the requirements of the most exacting projects. Working with accurate, rugged Logan Lathes, the instructor can plan and supervise a broad program that keeps student interest high. The result is more enthusiasm, more progress, and more skillful lathe operators at term's end. Furthermore, with Logan Lathes and Shapers, the student gains the practical advantage of training on standard tools of industry.

In all school shop ranges, 14″, 12″, 11″ and 10″ swing, Logan precision-built, dynamically balanced lathes bring a double budget benefit. They keep maintenance cost at minimum. Efficient production methods in the modern Logan Plant result in lower investment cost. For capacity, accuracy, value, choose Logan.

Brief Logan Lathe Facts . . .

Swing over bed, up to 14⅜″ . . . Swing over cross slide, up to 9″ . . . center distance, up to 40″ . . . Spindle hole up to 1⅜″ . . . Collet capacity up to 1″ . . . Ball Bearing Spindle for Sustained Accuracy . . . V-Belt Drive and Variable Speed Drive . . . Threads, 48 selections, RH or LH, 4 to 224 per inch.

Write for Catalog Information and Full Details on all the advantages Logan Lathes and Shapers offer.



14″ No. 6560

Quick Change Gear Lathe with Variable Speed Drive. 40″ between centers. 1⅜″ spindle hole, 1″ collet capacity.

NIAGARA MACHINE & TOOL WORKS

Buffalo 11, N. Y.

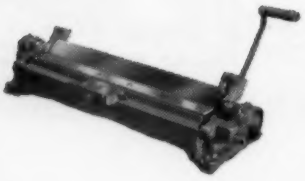
America's Most Complete Line of Presses, Shears, Machines and Tools for Sheet Metal Work

DISTRICT OFFICES: BUFFALO • CLEVELAND • DETROIT • NEW YORK • PHILADELPHIA

Dealers in principal U.S. Cities and major foreign countries

GET YOUR COPY OF BULLETIN 103-D

To Help You Layout and Equip Your Sheet Metal Working Shop











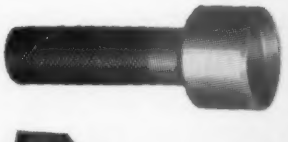


● School architects and heads of Industrial Educational Departments find it valuable for planning and equipping shops to accommodate various size classes.

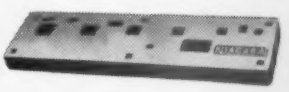


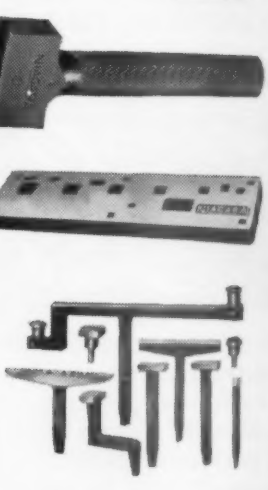
TRAIN YOUR STUDENTS ON THE SAME NIAGARA MACHINES USED IN ACTUAL WORK

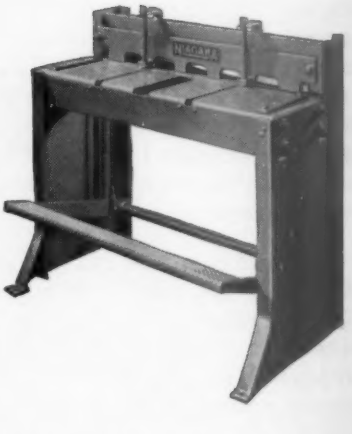
The selection of Niagara machines and tools has a very practical bearing on vocational training because they are identically the same machines that are used in everyday commercial work. What your students learn in your shop, they can apply easily and naturally when they step out into industry.

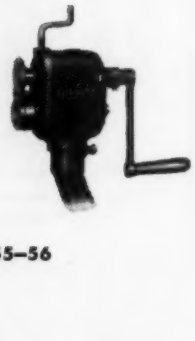














NIAGARA

75 Years of Experience in Serving the Metal Working Industry

OLIVER MACHINERY COMPANY

Established 1890

Grand Rapids 2, Michigan

"Oliver" Woodworking Machinery

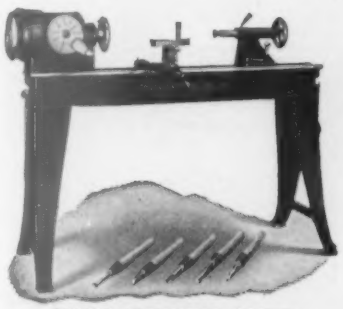
Engineered to give vocational shops the most for their dollar

GIVE your students a solid foundation for progress when they enter industry. Train them *right* with "Oliver" machines. Instructors in over 2350 vocational shops *know* "Oliver" equipment gives the finest service year after year, for it is built to pay its way on factory floors the world over. Such equipment is essential for practical, thorough training. On this page are shown a few machines of a complete line for vocational shops.



No. 91
Hollow Chisel
MORTISER

Cuts clean mortises rapidly. Stroke from 2½" to 4". Takes chisels ¼" to ¾" square. With 5 h-p. motor it handles chisels up to 1½" square. Offered with universal compound table or plain table.



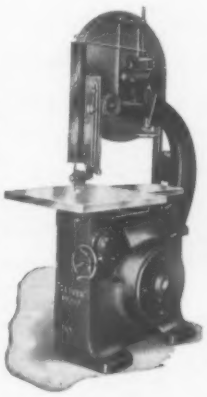
METAL SPINNING LATHE

Lathe shown above has 12" diameter swing. Extra heavy bed and large bearings enable it to withstand tremendous pressures. Motor driven headstock has dial control. Spindle speeds adjustable from 800 to 2750 r.p.m. Ball bearing tail center. "Oliver" Metal Spinning Lathes also made in sizes with 16", 20", 24" and 30" swing.

"Oliver" makes a complete line of the finest woodturning lathes

No. 217D
BAND SAW

Has rubber faced disk wheels 30" diameter. Table 20"x28" tilts up to 45° to right, 10° to left. Uses blades ⅛" to 1½" wide. Offered with high-speed motor to cut wood, plastics, etc. Foot brake with cutout switch for lower wheel, automatic brake for upper wheel. Accurate, quick adjustments. "Oliver" Band Saws also made in 18", 36", 38" sizes.



No. 287T
SHAPER

This Shaper is one of five built in single and double spindle types. Has 42" x 42" table. Spindle runs true at speeds up to 8400 r.p.m. Produces smoothest work feeding stock to cutter with or against the grain.





No. 384 Oilstone
TOOL GRINDER

Quickly sharpens plane bits, chisels, knives, etc. Has one coarse and one fine oilstone, emery wheel, tool rest, and adjustable tool rest table for parallel grinding. A heavier model also has emery cone and leather stropping wheel.



No. 194B
BORER

Handles wide range of vertical boring operations. Bores holes up to ¾" diameter in hardwood, to 1½" diameter in softwood, in edge of 22-inch stock with table, 36-inch without table. Table has 22" vertical adjustment. Ball bearing motor-on-spindle drive. Compact, sturdy design.

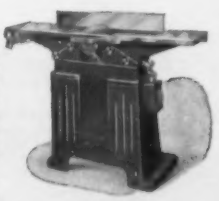


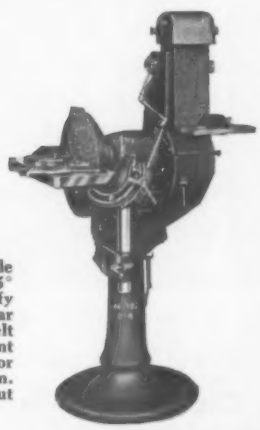
No. 299
SURFACER

Sturdy and compact. Takes stock up to 24" wide, 8" thick, short as 11". Power driven rolls feed 18' to 40' a minute. Built - in knife jointer and grinder always ready for use. Other single and double Surfacers from 18" to 36".

No. 144
JOINTER

This 8-inch Jointer has direct motor drive and sturdy one-piece bed. Safety cylinder has three knives. Oversize ball bearings for years of smooth operation. "Oliver" Jointers come in capacities from 6" to 30".





No. 182DB
Disk-Belt
SANDER

Has 15" disk. Table tilts 45° down, 25° up. Gauges simplify angular and circular work. A 6-inch belt sanding attachment runs in vertical or horizontal position. Available without belt sander.

"OLIVER" EQUIPMENT FOR VOCATIONAL SHOPS

Circular Saw Benches	Wood Turning Lathes
Straitline Cut-off Saws	Sanders—Belt, Disk, Drum
Band Saws	Shapers
Jig Saws	Tenoner
Horizontal Borers	Jointers
Vertical Borers	Oilstone Tool Grinders
Mortisers	Knives and Saws
Wood Trimmers	
Metal Spinning Lathes	

Send for illustrated bulletins containing full details



No. 270
Tilting Arbor
SAW BENCH

Cuts a perfect miter, cuts off to length, rips to width, dadoes accurately. Rips 29" wide with plain fence, or 24" with universal fence. Cross cuts to 16" wide 3" thick.

POWERMATIC MACHINE CO.

McMinnville, Tennessee

POWERMATIC PLANERS
FOR THE MODERN SCHOOL SHOP



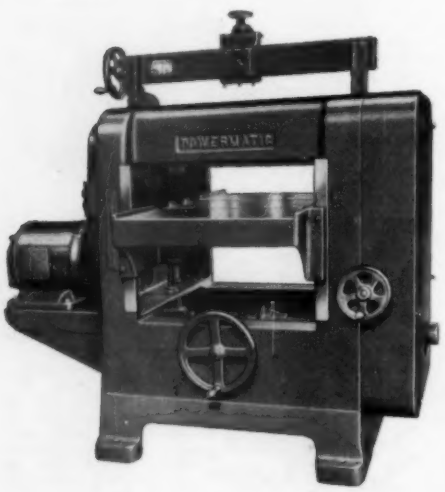
MODEL 100—12″ PLANERS

The Powermatic 12″ planer is completely new in design and includes features that make it ideal for the modern School Shop. The one piece extra heavy cast iron frame is precision machined and bearing housings line bored for perfect alignment. Cutterhead is mounted in sealed ball bearings turning up to 4400 RPM, making 13,200 cuts per minute. The corrugated infeed roller and smooth outfeed roller are 2″ in diameter, driven by heavy cut gears. All moving parts are completely guarded for safe operation. Pressure bar and chipbreaker are mounted exceptionally close to the cutterhead, and may be adjusted while machine is in operation.

MODEL E—16″ PLANERS

The Powermatic E-16″ Planers feature complete cast iron construction, with all parts precision machined and ground for perfect alignment. More and more every day the E-16 is proving itself superior in School Shops throughout the country. The easy adjustment, safe operating features and long life appeal to the student as well as the instructor. The three knife, 4″ diameter cutterhead features jack screws for adjusting knives (as do all Powermatic Planers), and is mounted in oversize precision ball bearings. Chipbreaker and pressure bar are mounted concentric to cutterhead and fitted close to knife cutting circle. Available in either Direct or Belted drive.





MODEL 220—20″ PLANERS

The Powermatic 200-20″ Planers have an all cast iron constructed frame, precision machined throughout, and mounted on a one piece cast iron base to assure perfect alignment for the life of the machine. The cutterhead, 4″ in diameter is fitted with high speed steel knives, adjusted by jack screws, and is mounted in oversize precision ball bearings. The feed mechanism is driven with a totally enclosed 1 HP motor mounted in the base of machine. The feed has a range of 20 to 50 feet per minute, regulated by a variable speed pulley. Feed rolls are driven with roller chain and sprockets, insuring long life and smooth operation. Can be equipped with sectional infeed rolls and chipbreaker.

Also Manufacturers of Chain and Hollow Chisel Mortisers, Single End Tenoners and 6″ and 8″ Jointers.

SOUTH BEND LATHE WORKS

South Bend 22, Indiana

SOUTH BEND MACHINE TOOLS

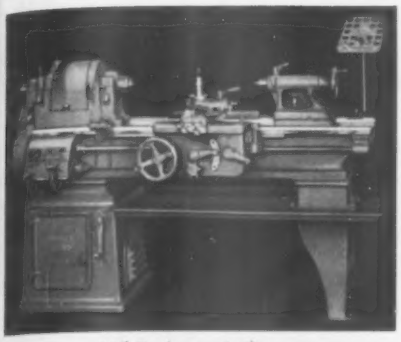
Make Teaching Easier

These popular machine tools make teaching easier because students learn faster on them. Less supervision is required because their simplicity of design and safety features promote faster development of machine handling skill. Also, more time is left for productive work — projects are completed quicker. Student interest is kept at a high level. Less material is spoiled.

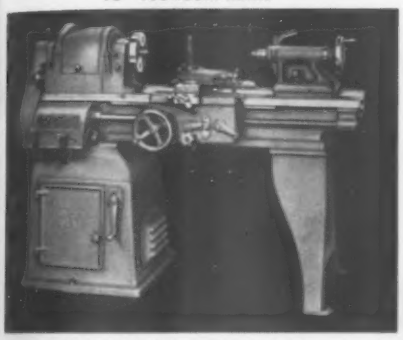
Write, requesting information on the machines in which you are interested—find out why they are favorites of shop teachers everywhere.



Lathe Tools And Attachments



16" Toolroom Lathe



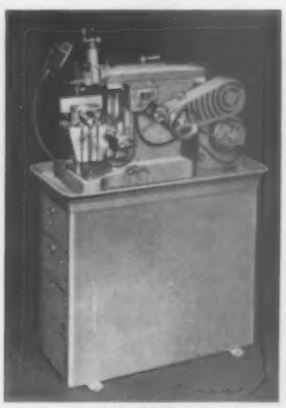
14½" Quick Change Gear Lathe



13" Toolroom Lathe



14" Drill Press



7" Bench Shaper



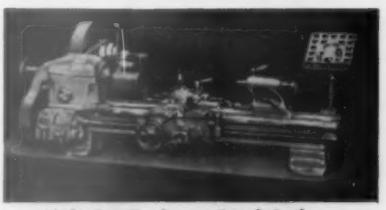
10" Quick Change Gear Lathe



9" Floor Lathe



Pedestal Grinder



Light Ten Toolroom Bench Lathe



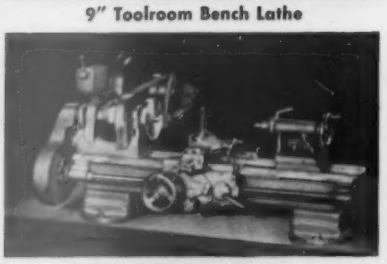
Light Ten Model B Bench Lathe



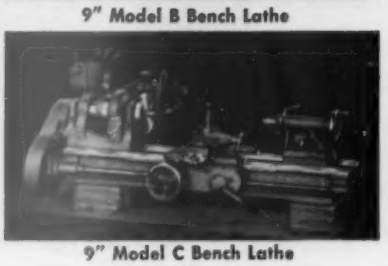
Light Ten Model C Bench Lathe



9" Toolroom Bench Lathe



9" Model B Bench Lathe



9" Model C Bench Lathe

BOOKS AND FILMS FOR SHOP CLASSES



Shop classes get off to a good start with South Bend teaching aids. Teaching is easier with text instruction from the "How To" series —"How to Run a Lathe," "How to Run a Drill Press," "How to Run a Shaper."

A Machine Shop Course Book and several wall charts are also available at small cost.

Motion pictures on lathe operation can be had on a free-loan basis. Three 16 mm color sound films cover "The Lathe," "Plain Turning" and "Grinding Cutter Bits." They show the lathe, its principal operations and major applications.

Write for Bulletin 5329, which also includes 3-D scale model shop planning and color slides.



WALKER-TURNER DIVISION

KEARNEY & TRECKER CORPORATION

PLAINFIELD, NEW JERSEY



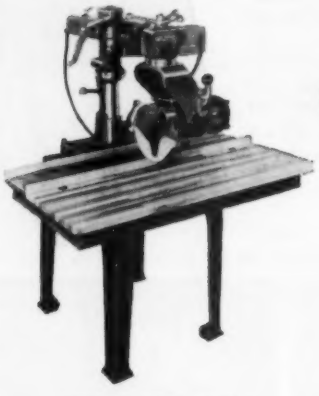
BAND SAW

NEW 16" MODEL—with Variable Speed Drive—50 to 4500 SFM. Cuts metal, plastics, wood. Blade to frame 16"; upper guide to table 8". Infinitely variable speeds without belt or pulley changing. Table size 18" x 19"; tilts to 45°. Improved guides adjust to all blade widths.
Also available in single speed models for wood or plastics cutting.

walker-Turner

LIGHT-HEAVYWEIGHTS

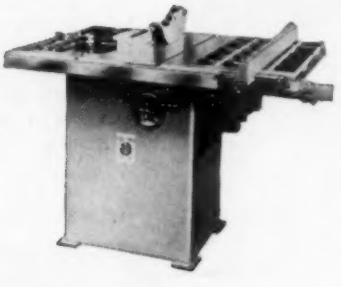
Walker-Turner *Light-Heavyweights* permit you to equip your school with genuine industrial machines without heavy investment. Safe, rugged, efficient—Walker-Turner *Light-Heavyweights* train your students on machines with capacity for a wide variety of jobs in both metal working and wood working . . . machines they will actually use in industry. The slightly higher initial cost of Walker-Turner *Light-*



RADIAL SAW (900)

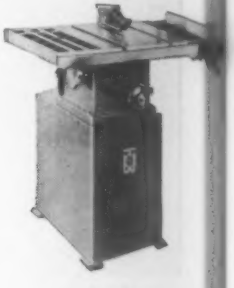
A work-horse for ripping, mitering, shaping, tenoning, rabbeting, dadoing, routing and dozens of other jobs. New offset drive gets greater capacity (depth of cut) with smaller blades. Full visibility, easy to operate. Works at any angle, 12" blade cuts 4⅝" deep. Ram travel 24". 1½ and 3 h.p. models.

TILTING ARBOR SAWS



10" MODEL

Triple V belt drive. Capacity 3⅛" with 10" blade, dado 1⅛". Table 26¾" wide x 32½" deep with extension. With side extensions 44¾" wide. Speed 3800 r.p.m. Fence locks front and rear. Totally enclosed motor available.



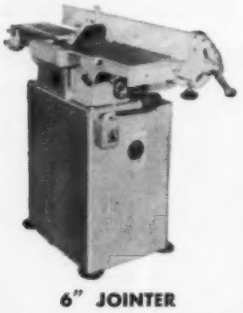
8" MODEL

Capacity 2⅝", 1½" at 45°, dado, 1⅜". Table size, with extensions 23" x 37". Spindle speed 4000 r.p.m. Aluminum rip fence has micrometer adjustment. V belt drive. Guard and splitter supplied. Totally enclosed motor available.



VERTICAL SPINDLE SHAPER

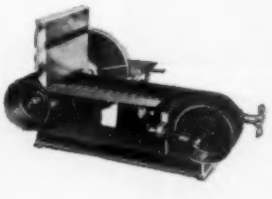
Two speeds, 7000 and 11,000 r.p.m., with dynamically balanced pulley for smooth operation. Independently adjustable guides. Complete cutter guarding. Graduated spindle adjustment. New type nylon cord reinforced V belt drive.
Spindle travel 3" on dovetail ways. Cast grey iron table, 22" x 33". One piece heavy gauge steel base. Totally enclosed motor available.



6" JOINTER

Dual purpose guard permits work to be fed under it while operator's left hand, resting on it, applies necessary pressure. Totally enclosed motor available. Texrope drive with triple V-belts permits efficient close-coupled motor connection. Solid steel 3-knife cutterhead, rabbets to ½" deep. Speed 3900 r.p.m.

◀ BELT and DISC SURFACER



Both tables tilt from 90° to 45°. One piece cast iron frame, dust-sealed ball bearings. V-belt drive with built-in guard. Aluminum alloy sanding disc, 10". Belt 4" wide, distance between pulley centers, 18½". Belt speeds 900, 1760 and 3200 r.p.m., disc 660, 1280 and 2350 r.p.m.

24", 4-SPEED JIG SAW ▶

Patented blade tensioner makes possible rapid blade changes. Tension adjustments can be made while machine is running. Positive action, built-in-base blower delivers constant air pressure. Adjustable saw guide and hold-down. Arm movable to sides, removable for large work. Table size: 12¾" x 16" tilts to 45°. Four speeds: 600, 900, 1250, 1740 r.p.m. with 1740 r.p.m. motor.



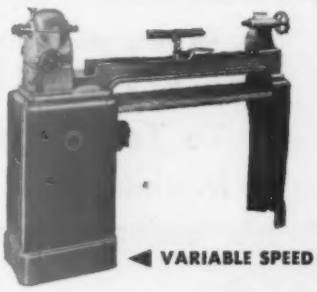
WALKER-TURNER DIVISION

KEARNEY & TRECKER CORPORATION

PLAINFIELD, NEW JERSEY

...r Metal and Woodworking Operations

...yweights will be more than repaid in greater use-ability, longer ...ble-free life, safer operation. No hobbyist machine can ap... *Light-Heavyweights* in simplicity and sturdiness of con...ction in frame or moving parts. There is a *Light-Heavyweight* ...hine designed to do practically any job in your school shop. ...ite for the name of your nearest Walker-Turner distributor. ... will be glad to demonstrate.

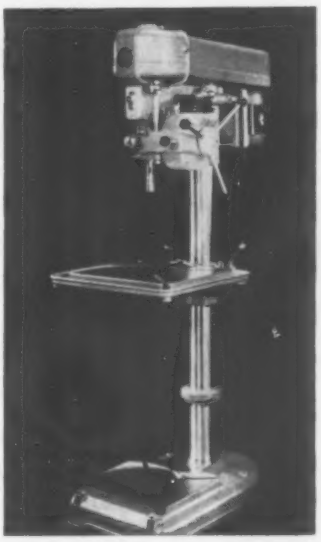


◀ **VARIABLE SPEED LATHE**

Heavy cast iron headstock and double row pre-loaded spindle bearings and carefully machined cast iron gap bed, make it ideal for wood turning and metal spinning. Spindle speeds, changed while machine is running, controlled by hand wheel in front of headstock. Speeds from 660 to 3550 r.p.m. with 1740 r.p.m. motor. Swing over gap 15½", over bed 12", distance between centers 38".

20" DRILL PRESSES Hand or Power Feed ▶

Heavy one-piece cast iron head is line bored for accuracy. 6" spindle travel, adjustable spring return. Capacity ¾" in steel, 1" in cast iron. Spindle speeds 400, 800, 1200, 1800, 2600 r.p.m. using 1740 r.p.m. motor. 10 spline spindle. Available No. 2 and No. 3 Morse Taper Spindle. Bench, floor, and multi-spindle models.





◀ **15" DRILL PRESSES**

Available in bench and floor models. Wide speed range. Four step spindle and motor pulleys develop 600, 1250, 2440 and 5000 r.p.m. with 1740 r.p.m. motor. Slo-speed attachments available. Adaptable for sanding, grinding, mortising, shaping and many other operations. New head design—4 ball bearings, six spline spindle. Spindle travel 4¼", and 6". 1 to 6 spindle models.



◀ **RADIAL DRILL PRESS**

Drills to center of 62" circle or anywhere on sheet stock up to 5 ft. wide. Handles all drilling and tapping jobs to ½" in cast iron. Built-in ball bearing jackshaft gives wide speed range and utility. Drill head, ram and cradle may be swung in complete circle. Locks securely in any position.

Six spline, full floating type spindle travels 4¼". Ram travel 18". Fifteen spindle speeds; from 160 to 8300 r.p.m. using 1740 motor, 110 to 5400 using 1140 motor.



MOTOR GRINDERS

Totally enclosed motor—special shaft seals prevent dust from damaging vital parts. Motor end bells are extended, allowing use of both sides of grinding wheels. Heavy-duty wheel guards with removable covers. Adjustable tool rests. 7" wheel operates at 3450 r.p.m. with ½" h.p. single phase motor. Other sizes and combination sander-grinder available.

Practical Aids for Industrial Arts Teachers

Written by a man who has spent his entire career in Industrial Arts and Vocational Education work, these aids are new, easy to understand, entirely practical. Prices are based on cost only.

SHOP PLANNING MANUAL — $1.00 each. First comprehensive manual. 48 pages, over 750 silhouettes of shop equipment.

TEACHING AIDS — FREE set. Complete 4-page folders on care and use of individual tools.

MACHINE SAFETY CHARTS — 10c per set. Ten cards — each message has a positive approach. Helps keep students safety conscious.

STUDENT PLAN SHEETS — 50c per hundred. Two-page form for use by students to plan their own work.

FREE CATALOG — Describes complete line of Walker-Turner metal-cutting and woodworking machines.

Your order along with proper amount will get prompt attention from the factory. Address WALKER-TURNER DIV., Educational Dept. AS, Plainfield, N. J.

WALKER-TURNER

• DIVISION •

KEARNEY AND TRECKER CORPORATION

PLAINFIELD, N. J.

Drill Presses—Hand and Power Feed • Radial Drills Wood and Metal Cutting Band Saws • Tilting Arbor Saws Radial Saws • Jig Saws • Lathes • Spindle Shapers Jointers • Belt and Disc Surfacers • Flexible Shaft Machines

U. S.-BURKE MACHINE TOOL DIV.

35 Brotherton Road, Cincinnati 27, Ohio

DESIGNED

To Teach Basic
Machining Skills
With Minimum Investment





U. S. VERTICAL Milling Machines

BURKE BENCH MILLERS

- **Perform All Standard Milling Operations**
- **Simple Operation Increases Value As Instructive Aids, Permits Practical Shop Teaching**
- **Within Cost Range of School Shops**
- **Accuracy Certified, Rigidly Built**

U. S. Vertical Mills

• Fine grained alloy steel spindle • Precision ground #9 B&S taper • Spindle bearings pre-lubricated, sealed. No further adjustment needed • 6 spindle speeds: 250 to 2850 RPM with standard motor; with Lima Drive Motor, 24 spindle speeds from 60 to 2850 RPM • Overarm permits 7" head travel • Head may be set any angle through 180°. Power Feed Head also available with feed infinitely variable from .002" to .008" per revolution • Drive: 1 HP motor through V-Belt, matching 6 step pulleys.

U.S.-BURKE Milling Machines offer ease of instruction on all standard metal milling operations, help teach fundamental principles through duplication of actual shop operations in miniature. Write for full information and quotation.

Burke Bench Millers

Sizes #1 and #3 • Hand Feed units • #9 B&S taper spindle is heat treated, ground, mounts in Timken Bearings • Rack and Pinion Longitudinal 8" Feed • Traverse 3⅜" Feed • #1 has 4½", #3 has 7½" vertical travel • Powered by choice of ½ HP standard or gearhead or ¾ HP Lima motor • 3 spindle speeds with standard motor • 12 speeds with Lima motor • Range: 66 to 2875 RPM depending on motor selected.

Size #4 • Plain or Universal Power Feed Models • Heat treated, ground, Timken bearing mounted spindle has #9 B&S taper • Screw Feeds: Plain Model: Longitudinal 8"; Traverse 3"; Vertical 8". Universal: 10", 2", 7". • Choice of motors for 3 to 12 speeds • Range: 66 to 2875 RPM • Direct drive by V-Belt and matched pulleys • Accessories: pedestals, vertical milling attachment, indexing centers, dividing head, plain, quick opening and graduated swivel vises.

U. S.-BURKE MACHINE TOOL DIV.
35 Brotherton Road, Cincinnati 27, Ohio

ELECTRIKILN DIVISION

The Harrop Ceramic Service Co., Dept. U,
35 East Gay Street, Columbus 15, Ohio

ELECTRIKILNS . . . specially suited for classroom and laboratory

Designed simply . . . for dependable, economical operation . . . fast-firing ElectriKilns have proved themselves for years in schools and colleges throughout the country. WRITE US for representative list of installations . . . then write these users for their own opinion of ElectriKilns.

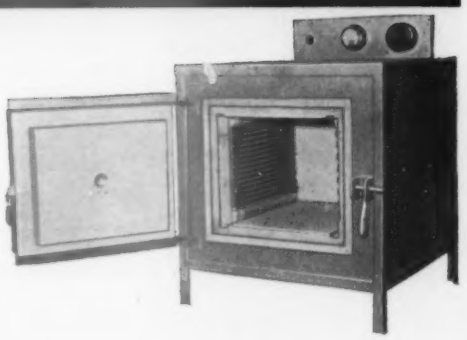
"HI-FIRE" Top-Loading ElectriKiln Model HTL-16, for Cone 8 (2300°F.)



All Top-Loaders have extra-long-life elements in recessed grooves . . . means easier replacement, no loose staples.

Model No.	FIRING CHAMBER			OUTSIDE DIMENSIONS			Firing Chamber	Max. Temp.
	Width	Length	Height	Width	Length	Height	Cu. In.	
TL-4	11	11	6½	19½	19½	19	786.5	2000
TL-5	11	11	10	19½	19½	19½	1210	2000
TL-6	12	12	10	20½	20½	19½	1440	2000
TL-8	18	18	15	26½	26½	24½	4860	2000
HTL-16	16	16	15	25	25	30	3840	2300

Typical bench Side-Loader . . . Model C-500



Bench and Floor models . . . wide range of capacities and accessory controls.

Side-Loading Model No.	Firing Chamber				Max. Temp.
	Width	Depth	Height	Cu. In.	
HT-15	14	14	15	2940	2300° F
HT-09	9	9	9	729	2300° F
C-1214	12	14	11	1848	2000° F
C-500	7½	9	11	742	2000° F
509	9	9	9	729	2000° F

Representative Floor Side-Loader . . . Model 819

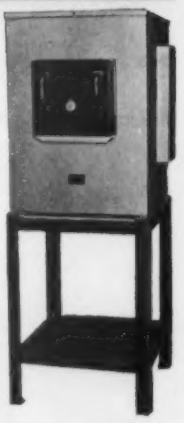


Open-type heating elements have long life . . . placed under hearth and on sides to insure even heat distribution.

Model No.	FIRING CHAMBER			Chamber Cubic Inches	OVERALL EXTERIOR		
	Width	Depth	Height		Width	Depth	Height
715	14"	14"	15"	2840	29"	30"	60"
819	18"	18"	19"	6156	33"	35"	65"
920	20"	22"	22"	9680	35"	40"	72"

Globar equipped LTG and GB Series

Non-metallic Globar* heating elements permit higher firing temperatures . . . kilns do not require stacks or chimney outlet.



Model No.	FIRING CHAMBER			Chamber Cubic Inches	OVERALL			Max. Temp.	K.W. Input Without Transformer
	Width	Height	Depth		Width	Height	Depth		
LTG-9	9"	9"	9"	729	25"	30"	21"	2500	5 K.W.
LTG-12	12"	12"	12"	1728	32"	60"	32"	2500	12 K.W.

Model No.	FIRING CHAMBER			Chamber Cubic Inches	OVERALL*			Max. Temp.	K.W. Input Without Transformer
	W	H	D		W	H	D		
GB 9	8"	9"	9"	648"	27½"	56"	39"	2700°F.	This Kiln to be operated with transformer only
GB10	10"	11"	11"	1210"	33"	60"	38"	2700°F.	16 K.W.
GB12	12"	12"	17"	2448"	35"	60"	46"	2700°F.	16 K.W.
GB15	15"	15"	19"	4275"	38½"	66"	46"	2700°F.	25.6 K.W.
GB20	20"	20"	25"	10,000"	44½"	66"	55"	2700°F.	30 K.W.

*Does not include space switch panel and transformer.

*Globar is a registered trade mark of, and indicates manufacture by, the Carborundum Company.

MANY OTHER ELECTRIKILNS Including Enamelling and Muffle types. SUPPLIES glazes, colors, finishes . . . tools, kiln furniture and supplies, wheels . . . nets and laces

WRITE FOR COMPLETE CATALOG

. . . to HARROP, Your One Reliable Source for Every Ceramic Need.

PERENY EQUIPMENT COMPANY

Dept. W., 893 Chambers Road, Columbus 12, Ohio

PERECO KILNS AND FURNACES

Here are a few typical items in the complete line of PERECO EQUIPMENT for many of your school needs

Easy to use, compact, durable, and priced amazingly low!



FULLY SELF-CONTAINED MODELS

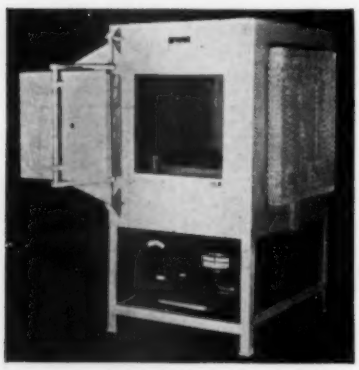
including instruments for accurate control

"CB SERIES"—Students in ceramics and metals develop special skills more readily from practical experience with Pereco industrial-type equipment. An ideal training unit, the electrically operated CB-55 (left) is one of a series of tool hardening, brazing, sintering and general shop furnaces.

"LB SERIES"—One of a group of ceramic kilns, the LB-74 (right) with built-in controls and instruments, saves space in crowded labs or classrooms. Globar non-metallic elements quickly and evenly heat the thickly insulated working chamber, reaching 2700° F. for continuous use and up to 3000° F. for short runs.

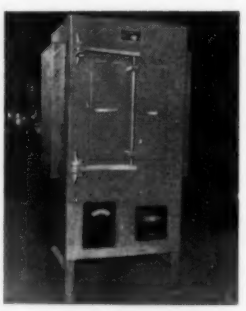


PERECO OFFERS A WIDE CHOICE OF TYPES AND SIZES



Some for high temperatures

Pereco Electric Kilns and Furnaces cover a wide range of heat applications, firing schedules, and work capacities. This simplifies selection of the most practical equipment for instructional use. The SM-7800 at left, for example, is a stock unit that provides easily regulated temperatures up to 2700° F. There are many more.



Others for low...

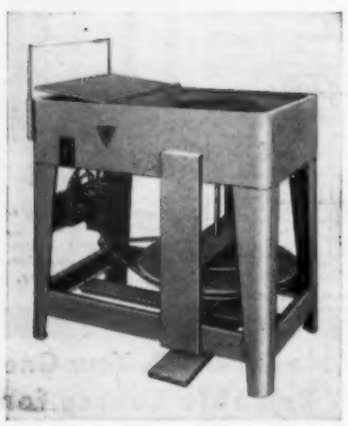
A variety of efficient, bench-type, electric units in the Pereco line have ample capacity for classroom projects requiring relatively low temperatures. All are handily portable, simple to operate, safe and clean. We invite your inquiries.

• NEW LINE OF PERECO GAS UNITS ALSO AVAILABLE

Standard and special models for any temperature from 450° to 5000° F.



OTHER TEACHING AIDS



Electric Melting Pots— for lead, tin, and other nonferrous metals

This equipment is complete and ready to use for melting type metals in print shops, for lead or tin dipping, etc. Automatic temperature controller keeps heat constant at desired levels. Model L-818 shown here has capacity for 400 lbs. of tin. Another smaller Model L-810 holds 250 lbs. of tin. Both of these reach a maximum temperature of 900° F.

Potters Wheels— motorized or kick type

Pereco Patented Variable Speed Wheels, with self-aligning ball-bearing mount and foot-controlled stepless friction clutch, assure smoothly regulated, mechanical turn of clay in work. Kick Wheel is similar to motor-driven unit shown here. Either wood or all-steel frames.

WRITE FOR DETAILS TODAY

• **Ball Mills** • **Whirlers** • **Ceramic Hand Tools**

THE INTERIOR STEEL EQUIPMENT CO.

2351 East 69th Street, Cleveland 4, Ohio



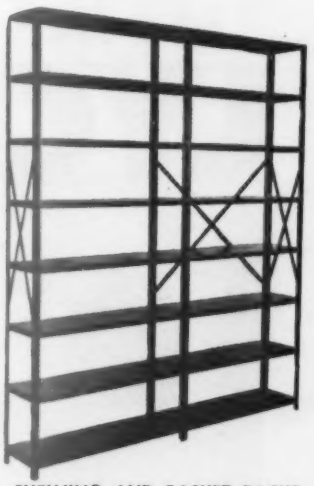
LOCKERS

A COMPLETE LINE

- Steel Lockers
- Book Cases
- Shelving
- Filing Cabinets
- Storage Cabinets
- Drafting Tables
- Key Cabinets
- Herbarium Cases
- Work Benches
- Transfer Cases
- Wire Baskets
- Steel Specialties

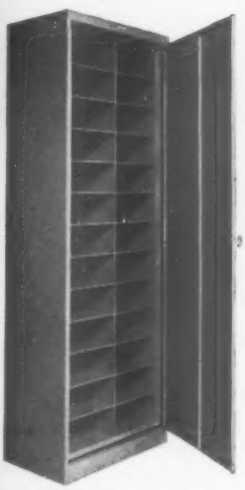
Interior Steel LOCKERS can be had in a variety of styles and sizes. They are made in accordance with Federal specifications No. AA-L-486. Our catalog will give you the complete line which will meet your needs.

Interior Steel SHELVING and BASKET RACKS are built up from simple standard, quickly assembled parts, and it is possible to obtain hundreds of different combinations of unit styles and sizes, so as to meet your requirements. Write for our catalog.



SHELVING AND BASKET RACKS

Interior Steel HERBARIUM CASES offer complete protection for safe storage of specimens from the destructive influence of vermin, dust and air. These cases have been used in many leading museums and universities.



HERBARIUM CASES

Interior Steel 1100 Line STORAGE CABINET. A complete line which would be an asset to any room or office, available in a variety of sizes and styles. Write for your catalog.



STORAGE CABINETS

Interior Steel LIBRARY UNITS put to work every inch of storage space with one inch adjustment of shelves. This makes easy and quick rearrangement to meet your current needs.

Interior Steel DRAFTING TABLES. Can be used for a variety of drawing classes. The table has a smooth steel top with an adjustable hinged section, flanged at bottom to hold drafting board. Individual locked drawers for six students.

Interior Steel PLAN FILES are designed for use in industrial art and mechanical shops of vocational schools. They can be had in a variety of sizes and either three or five drawer units. Cases are electro-welded which gives you sturdy construction. For further information write for our catalog.



PLAN FILES



DRAFTING TABLE



LIBRARY INSTALLATIONS

—FOR STEEL EQUIPMENT SEE *"Interior Steel"*—

CATALOGS ARE AVAILABLE UPON REQUEST

LYON METAL PRODUCTS, INCORPORATED

General Offices: 1334 Madison Avenue, Aurora, Ill.

Factories: AURORA, ILL., YORK, PA.,

Sold Nationally through Factory Branches and Dealers

LYON® STEEL EQUIPMENT



MULTIPLE TIER LOCKERS

Most popular of all multiple tier lockers. This locker is ideal for most small storage requirements. Available in 5 high in the following sizes: 12x12x12—12x15x12, and 15x15x12; 6 high—12x12x12 and 12x15x12; 4 high—15x15x15 (per locker door opening). Green or non-glare gray finish.



SINGLE TIER LOCKERS

Most practical and widely used of all lockers. Recessed handles. Full length clothing storage. Shelf at top for hats, lunches, etc. Available in fourteen sizes from 9″ x 12″ x 60″ to 18″ x 21″ x 72″ (per locker door opening.) Green or non-glare gray finish.

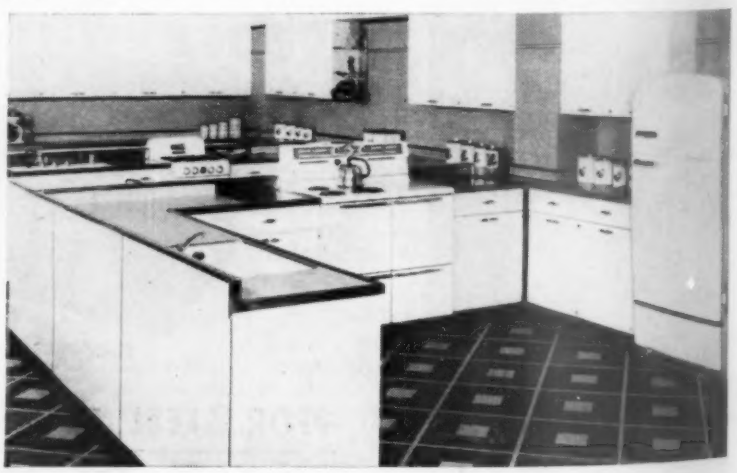


DOUBLE TIER LOCKERS

Economy in cost and space. Excellent for short period occupancy or where long coats are not worn. Available in sizes from 12″ x 12″ x 30″ to 15″ x 15″ x 36″ (per locker door opening). Green or non-glare gray finish.

KITCHEN CABINETS AND SINK UNITS

Beautiful steel kitchen cabinets and sinks are ideal for home economics classes and cafeteria kitchens. White baked-on enamel finish is easy to keep clean. Also available in six beautiful pastel colors—or we will match the color of your choice. Lyon kitchens are flexible enough to allow a "tailored fit" to any working arrangement desired. Tap-O-Matic handles—tap the handle and the door opens. Insulated for silent operation.



(Specifications subject to change without notice)

LYON METAL PRODUCTS, INCORPORATED

LYON® STEEL EQUIPMENT



DRAWING TABLES



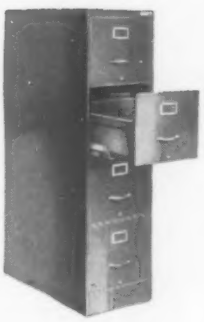
FLAT DRAWER FILES



WOODWORKING BENCHES



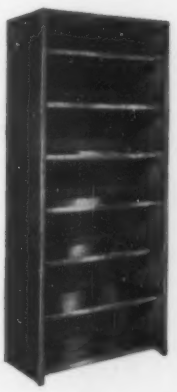
STORAGE CABINETS



FILING CABINETS



SERVICE CART



STEEL SHELVING



STEEL STOOLS



WORK BENCHES



FOLDING CHAIRS

A PARTIAL LIST OF LYON PRODUCTS

• Shelving	• Kitchen Cabinets	• Bin Units	• New Freedom Kitchens	• Flat Drawer Files	• Folding Chairs	• Service Carts	• Tool Stands
• Lockers	• Cabinet Benches	• Bar Racks	• Display Equipment	• Revolving Bins	• Coat Racks	• Sorting Files	• Shop Boxes
• Stools	• Storage Cabinets	• Tool Boxes	• Toolroom Equipment	• Filing Cabinets	• Work Benches	• Drawer Units	• Tool Trays
• Tables	• Drawing Tables	• Parts Cases	• Wood Working Benches	• Hanging Cabinets	• Bench Drawers	• Hopper Bins	• Shop Desks

FRED MEDART PRODUCTS, INC.

3550 DeKalb St. St. Louis 18, Missouri

SALES ENGINEERS IN ALL PRINCIPAL CITIES



MEDART STEEL LOCKERS

WITH A NEW TYPE LOCKING MECHANISM

• Positive Locking • Pre-Latching • Fool-Proof

The ONLY locker with ALL the practical features considered essential for maximum protection, longer service life and lasting new-like appearance

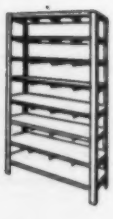
- Extra strong die-formed steel channel frame, welded into a permanently true and rigid unit.
- Patented "pick-proof" 3-point positive locking mechanism, rubber-cushioned, concealed in door frame.
- Rugged 5-knuckle steel non-sag hinges, welded and bolted to door and frame.
- Strong channel legs integral with frame.
- Baked enamel finish will not flake even under rigid hammer test. Standard colors: Desert Sand, Olive Green, and Gray.
- Available in all standard sizes and interior fittings. Extra shelves, sloping tops, special finishes are extra.

Write for Catalog

SINGLE TIER LOCKERS

60" x 72" Height
9" Wide x 12" Deep
12" Wide x 12" Deep
12" Wide x 15" Deep
12" Wide x 18" Deep
15" Wide x 15" Deep
15" Wide x 18" Deep

72" Height Only
18" Wide x 18" Deep
18" Wide x 21" Deep



WIRE BASKET SHELVING

The finest permanent and portable Wire Basket Shelving is made by Medart in sizes for every need.



DOUBLE TIER LOCKERS

30" Height
12" Wide x 12" Deep

36" Height
12" Wide x 12" Deep
12" Wide x 15" Deep
12" Wide x 18" Deep
15" Wide x 15" Deep

42" Height
12" Wide x 12" Deep
12" Wide x 15" Deep
15" Wide x 15" Deep



GYM SUIT LOCKERS

4 Tiers High

9" Wide x 12" Deep x 18" High

3 Tiers High

9" Wide x 12" Deep x 20" High
9" Wide x 12" Deep x 24" High
12" Wide x 12" Deep x 24" High



BOX LOCKERS

4 Tiers High

15" Wide x 15" Deep x 15" High

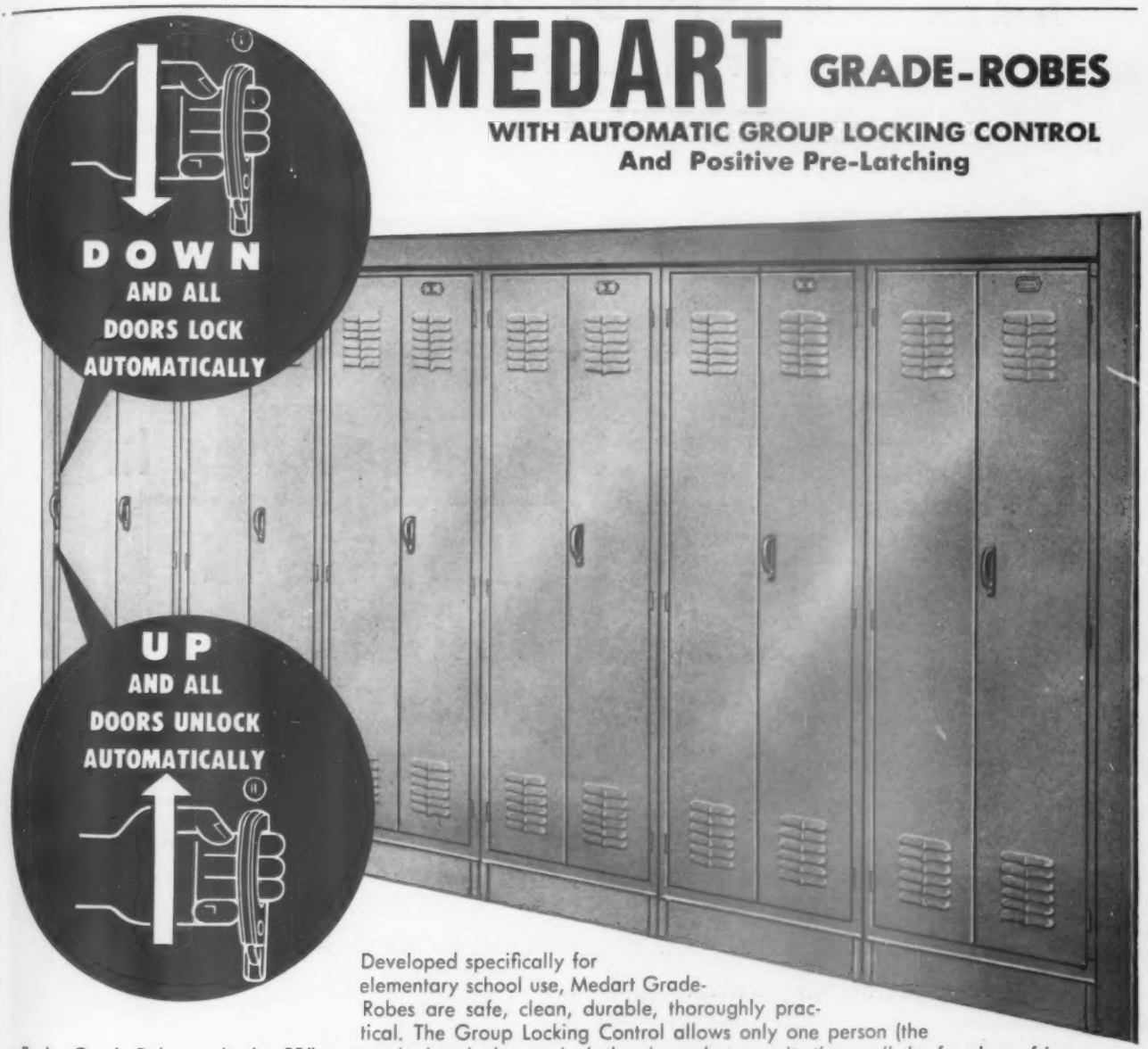
5 & 6 Tiers High

12" Wide x 12" Deep x 12" High
12" Wide x 15" Deep x 12" High
15" Wide x 15" Deep x 12" High

FRED MEDART PRODUCTS, INC.

MEDART GRADE-ROBES

WITH AUTOMATIC GROUP LOCKING CONTROL
And Positive Pre-Latching



Developed specifically for elementary school use, Medart Grade-Robes are safe, clean, durable, thoroughly practical. The Group Locking Control allows only one person (the teacher) to lock or unlock the doors, but permits the pupil the freedom of individual door operation when unlocked. When Master Control is locked, individual doors can be closed and will lock automatically, because of positive 3-point pre-latching, but cannot be opened.

Each Grade-Robe unit is 22" wide, 15" deep, 60" high. Rugged die-formed steel construction, amply ventilated. Various interior arrangements of pupil and auxiliary units are available. Standard finishes: Gray, Desert Sand and Olive Green. Grade-Robes are furnished for free-standing installation, or without legs for pre-built bases.

Grade-Robes can be installed in 16" deep unfinished recesses to eliminate the space wasted by ordinary wardrobes or separate cloakrooms, and thus reduce cubic footage of school buildings and save considerable cost. No finished walls, flooring, or overhead framing are required.

Write for Catalog

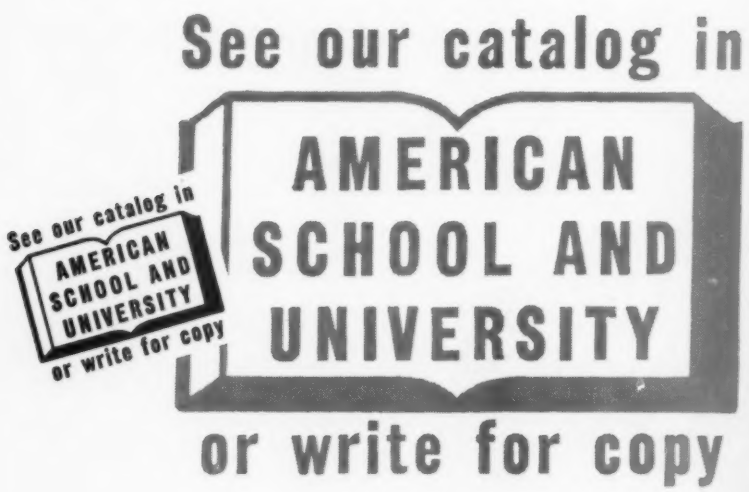
MEDART LOCKEROBES
WITH SIMULTANEOUS OPENING MASTER DOOR CONTROL

Lockerobes are similar in construction and size to Grade-Robes, except that one person not only controls the locking and unlocking of all doors, but also opens and closes all doors simultaneously. When the right-hand master control door is opened, all right-hand doors open; when left-hand master control door is opened, all left-hand doors open. Closing of doors is also done simultaneously by operation of master control doors. Door handles and lock are required only on master control door.

AMERICAN SCHOOL PUBLISHING CORP.

470 Fourth Avenue, New York 16, N. Y.

In the advertising pages of
THE SCHOOL EXECUTIVE–SCHOOL EQUIPMENT NEWS
and other school publications,
you'll often see this–



It means you'll not have to write for and wait for the complete information you need.

Within minutes, you'll find complete details in **AMERICAN SCHOOL AND UNIVERSITY** where manufacturers have elected to distribute their product information.

Always look in AMERICAN SCHOOL AND UNIVERSITY. It saves time and trouble. It's manufacturers' way of making your job easier.

Use A S & U

STAR STEEL EQUIPMENT CO., INC.

Dept. A-1, 117-20 Fourteenth Road, College Point 56, L.I., N.Y.

when it comes to STORAGE

come to STAR STEEL





STEEL LOCKERS

ALL SIZES

Single tier in single units or 2 or more wide. Double tier and multiple tier also available. Padlock attachment or built-in lock. Prelocking device can be furnished on single & multiple tier.

- All heavy gauge steel
- Built for rugged service
- Easy to assemble with hardware furnished

Slim Jim UTILITY CABINET

Wardrobe Style 24 WA; Storage Style 24ST
Ideal for narrow spaces, measures 72" x 24" x 18" or 24". There's 10 feet of shelf space in 24ST, or plenty of room for clothes in 24WA. Both styles easily interchangeable.





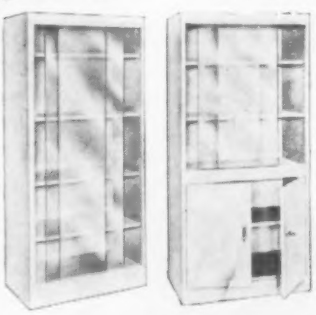
COMBINATION CABINET

Designed for wardrobe and storage duty in institutions, offices, factories. One full shelf, 3 adjustable half shelves, generous space for clothes. 72" x 36" x 18".
Style 3 CW



COUNTER-HI BOOKCASE

All welded construction, heavy gauge steel, no nuts or bolts needed. Finger-tip control of sliding ¼" plate glass doors. Dimensions: 12" d. x 36" w. x 42" h. Two adjustable shelves. Lock for glass door available. Also made without glass doors. Smart decorator colors or standard commercial colors.



DISPLAY CABINETS

Both measure 72" x 36" x 18". Have ¼" plate glass sliding doors. Style FGW (left) makes a perfect display cabinet. Style HGW (right) can be used for display and storage.

STAR STEEL has all the most modern facilities to insure products of the highest standards to meet every storage need.

WRITE DEPT. A-1 TODAY FOR CATALOGUE



BASKET SHELVING RACK

Designed for use in Dressing Rooms of Swimming Pools or Gymnasiums. Contains 28 baskets for economical and sanitary storage of clothing.
Rack Dimensions: 40"Wx13"Dx66"H; Basket Dimensions: 9"Wx13"Lx8"H. Rack finished in Green or Grey baked on enamel. Basket coated with special rust proof, hard alloy metal. Number plates supplied.

ABOVE ALL STAR STEEL

STAR STEEL EQUIPMENT COMPANY, INC.

Dept. A-1 117-20 Fourteenth Road, College Point 56, L.I., N.Y.

DUDLEY LOCK CORPORATION

Dept. 245, Crystal Lake, Illinois

(Suburb of Chicago)

DUDLEY LOCKS — standard of *controlled* locker protection since 1923







EXTRA SECURITY

Unique Dudley Master Key can't be duplicated on commercial key-making machines

DUDLEY RD-2
Rotating Dial Combination Padlock

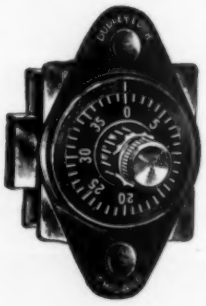
Rugged stainless steel case . . . enameled revolving dial with 40 easy-to-read dial divisions in white on black . . . reliable 3-tumbler mechanism . . . self-locking—tumblers spin, dial whirls when hasp is pushed home.

DUDLEY P-570
America's finest Master-Keyed Combination Padlock

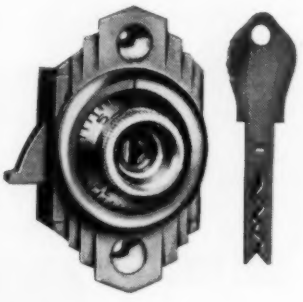
Beautifully engineered to provide the ultimate in security and control. Exclusive, Bell-type, pin-tumbler cylinder is exceptionally pick resistant. Sturdy, cast aluminum case, satin finished . . . extra-heavy shackle . . . revolving dial with divisions incised into steel.



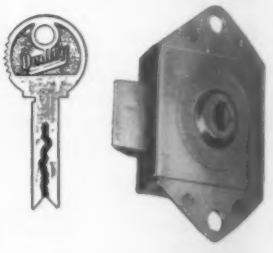
DUDLEY RP-5
Combination Padlock with Revolving Knob Pointer



DUDLEY L-4
Built-In Revolving Dial Combination Lock



DUDLEY S-540
Built-In, Master-Keyed Combination Lock with Dudley's exclusive feature . . . 15-second combination change

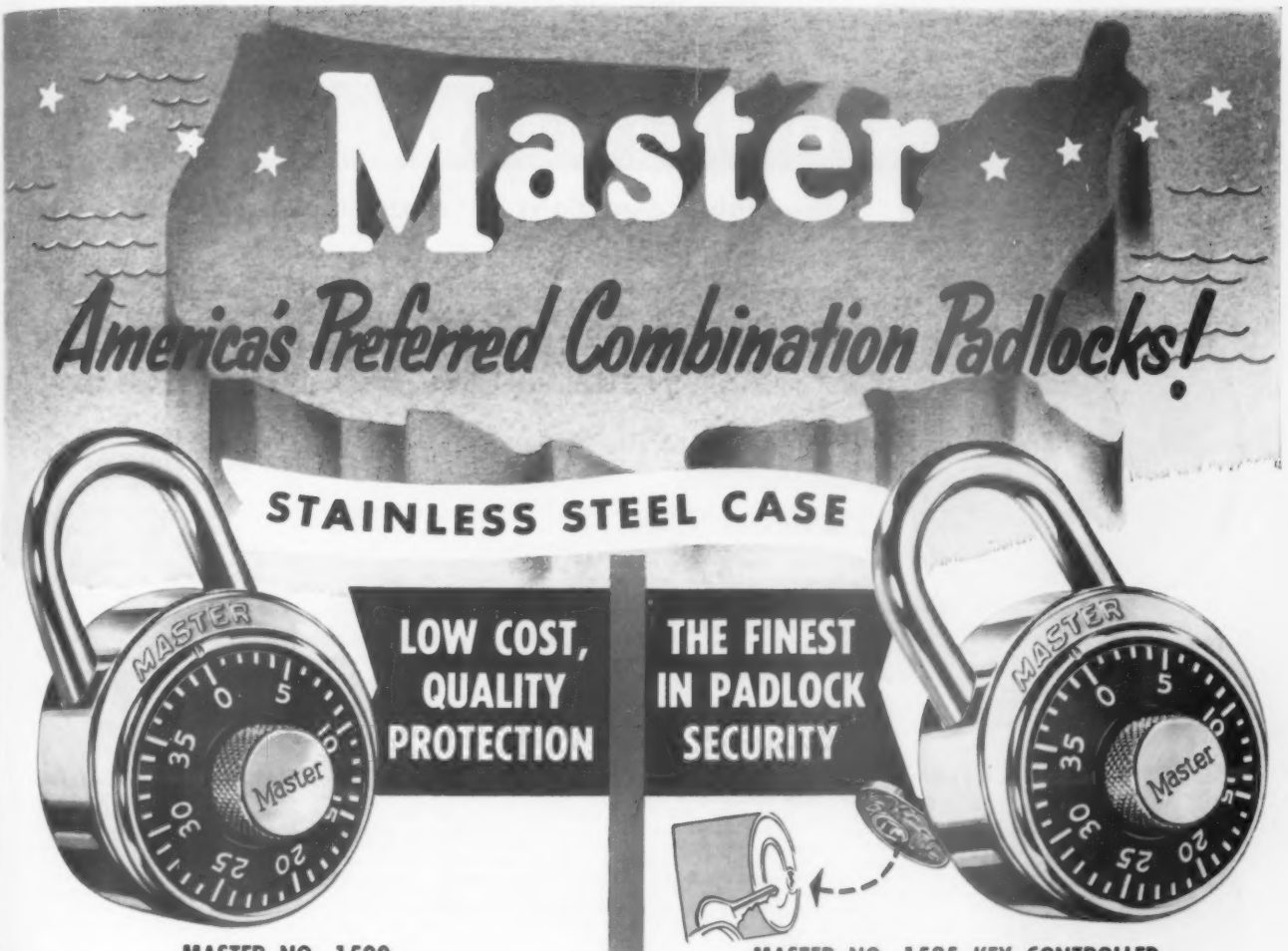


DUDLEY S-535
Built-In, Master-Keyed Lock for steel cabinets and lockers

EVERY DUDLEY LOCK CARRIES A TWO-YEAR WARRANTY

MASTER LOCK COMPANY

Milwaukee 45, Wisconsin



MASTER NO. 1500

Long time school favorite. Rugged, dependable construction . . . assures long life, trouble-free service. 3 number dialing . . . built-in sound effect prevents picking. Built like the lock on a safe.

How to Specify:

Padlocks, combination, 3-number, rotating dial type with 40 white graduations on enameled black dial. Stainless steel outer case, heavy steel inner case. Self-locking, automatically disarranging tumblers. Swivel shackle, diameter 9/32", clearance at least 13/16". Case diameter at least 1-7/8". Duplicate instruction tags. Furnish control chart. Padlocks shall be MASTER No. 1500 or approved equal.

MASTER NO. 1525 KEY CONTROLLED

Same as No. 1500 but with KEY CONTROL. Each student has own combination . . . yet one school-owned control key opens every locker. Genuine pin-tumbler mechanism — finest protection known to lock making.

How to Specify:

Padlocks, combination, key-controlled. Rotating dial type with 40 white graduations on enameled black dial, 3-number dialing. Stainless steel outer case, heavy steel inner case. Self-locking; automatically disarranging tumblers. Swivel shackle, diameter 9/32", clearance at least 13/16". Case diameter at least 1-7/8". Key-control mechanism of pin-tumbler construction. Keyway in back of lock. Duplicate instruction tags. Furnish control chart. Padlocks shall be MASTER No. 1525 or approved equal.

World's Largest Padlock Manufacturers **Master Lock Company.** *Milwaukee 45. Wisconsin*

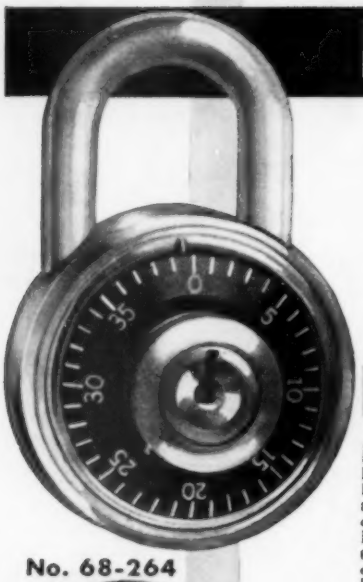
NATIONAL LOCK COMPANY

Rockford, Illinois

NATIONAL Combination LOCKS

dependable guardians of school lockers for 25 years

For complete locker protection at low cost . . . for simplified locker administration . . . choose NATIONAL Combination Locker Locks. Soundly-engineered for use on all styles of standard locker equipment, these quality locks assure the utmost in security, convenience, simplicity and durability. For trouble-free performance, select NATIONAL Locks.



No. 68-264

no. 68-264

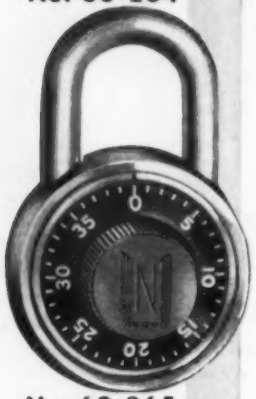
A high-quality, dependable combination shackle lock with Stainless Steel outer case. Dial is black enamel with white gradations. Lock has 5/16" dia. heavy-duty Chromium plated shackle. Requires three-number dialing to open. Thousands of different dialing combinations. Masterkeyed so it can be opened by authorized custodian.

no. 68-265

This outstanding shackle lock has many of the same excellent features as found in the No. 68-264. Shackle is 5/16" diameter. Lock must be dialed to three numbers to open. Dial is locked against rotation when shackle is open. This lock is not masterkeyed. Provided in plain zinc or bright Chromium finish. A dependable performer.

no. 68-267

The working parts of this built-in lock have been completely redesigned to provide added strength and long trouble-free protection. For use on lockers with spring latch bar. Closing door drops latch and automatically locks lock. Escutcheon is satin Chromium plated. Master key is included with each initial order of 12 or more locks.



No. 68-265

no. 68-268

This durable, redesigned lock has the same outstanding characteristics as the No. 68-267, except it is not masterkeyed. May be applied to many lockers now in use. Ideal for either right or left hand applications. Self-locking. On new lockers you buy, it will prove your assurance of long-term security.

no. 68-2440

This lock is designed for use on Vocational and Laboratory Furniture. It is of heavy solid Brass construction to withstand hard usage and acid fumes. It is available with masterkey or submaster key features, if desired. Half mortise application for either right or left hand doors or for drawers. A quality lock.

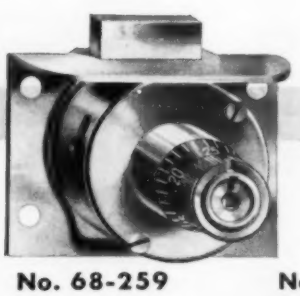
no. 68-259

Combination masterkeyed Laboratory Drawer or Door Lock. Combination can quickly be changed without removing lock from mortise. Lock is of solid Brass construction and is not affected by ordinary laboratory fumes and acids. This quality Rockford lock is reversible for use on right or left hand doors.

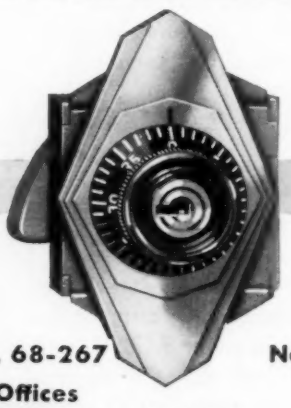
ask for illustrated folder showing complete line



No. 68-2440



No. 68-259



No. 68-267



No. 68-268

Branch Offices

Atlanta
Chattanooga
Chicago
Cincinnati
Clearwater, Fla.
Cleveland
Clinton, Ia.
Columbus
Dallas
Denver
Detroit
Elgin, Ill.
Evansville, Ind.
Fort Lauderdale, Fla.
Fort Worth
Grand Rapids
High Point, N. C.
Indianapolis
Jamestown
Kansas City, Mo.
Los Angeles
Martinsville, Va.
Milwaukee
Minneapolis
New York
Oshkosh, Wis.
Philadelphia
Portland
Rochester, N. Y.
St. Louis
San Francisco
Toronto, Ont.
Winnipeg, Man.
Worcester, Mass.
York, Pa.

G PHYSICAL EDUCATION—HEALTH

1. Bleachers & Grandstands

The American Welding and Manufacturing Company	**G–1/AmW**
Berlin Chapman Company	**G–1/Be**
Cretors	**G–1/Cr**
American Bridge, American Bridge Division, United States Steel Corporation	G 7
Castadia Inc.	G 8
Hussey Mfg. Co., Inc.	G 9
Fred Medart Products, Inc.	G 10, 11
Long Island Bleacher Co., Inc.	G 12
Pittsburgh-Des Moines Steel Company	G 13
Playtime Equipment Corp.	G 14
Safway Steel Products, Inc.	G 15
Sico Grandstands, Inc.	G 16
Universal Bleacher Company	G 17
Wayne Iron Works	G 18, 19

2. Athletic & Swimming Pool Equipment

All American Scoreboard Corporation	G 20
M. D. Brown Company	G 21
Fair Play Mfg. Co.	G 22
Naden & Sons Electric Scoreboard Company	G 23
Crouse-Hinds Company	G 24
General Electric Company, Apparatus Sales Division	G 25
Olin Mathieson Chemical Corporation, Industrial Chemicals Division	G 26
Wallace & Tiernan	G 27

3. Playground Equipment

The Desco Corporation	**G–3/De**
American Playground Device Company	G 28, 29
General Playground Equipment Inc.	G 30
Recreation Equipment Corporation	G 31

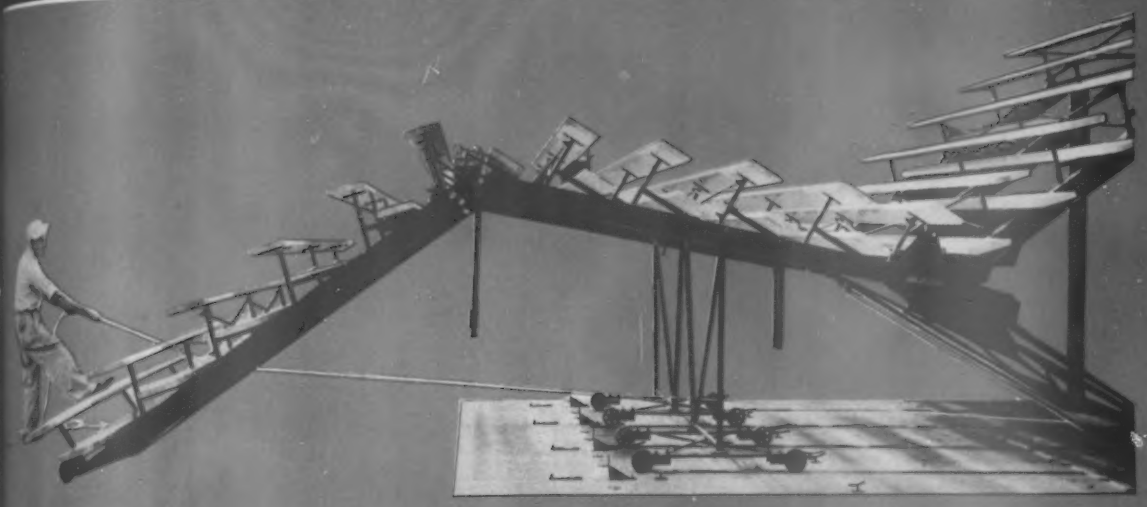
4. Locker Room Equipment

Pacific Shaw Company	**G–4/Pa**

5. Waste Receptacles

The Bennett Manufacturing Company	**G–5/Be**
United Metal Cabinet Corporation	G 32

G-1/AmW



AMWELD® EASI-FOLD BLEACHERS



- Gymnasiums
- Multi-Purpose Rooms
- Auditoriums
- Any Spectator Sports Area

INSTITUTIONAL PRODUCTS DIVISION

THE AMERICAN WELDING AND MANUFACTURING COMPANY

101 Dietz Road

Warren, Ohio

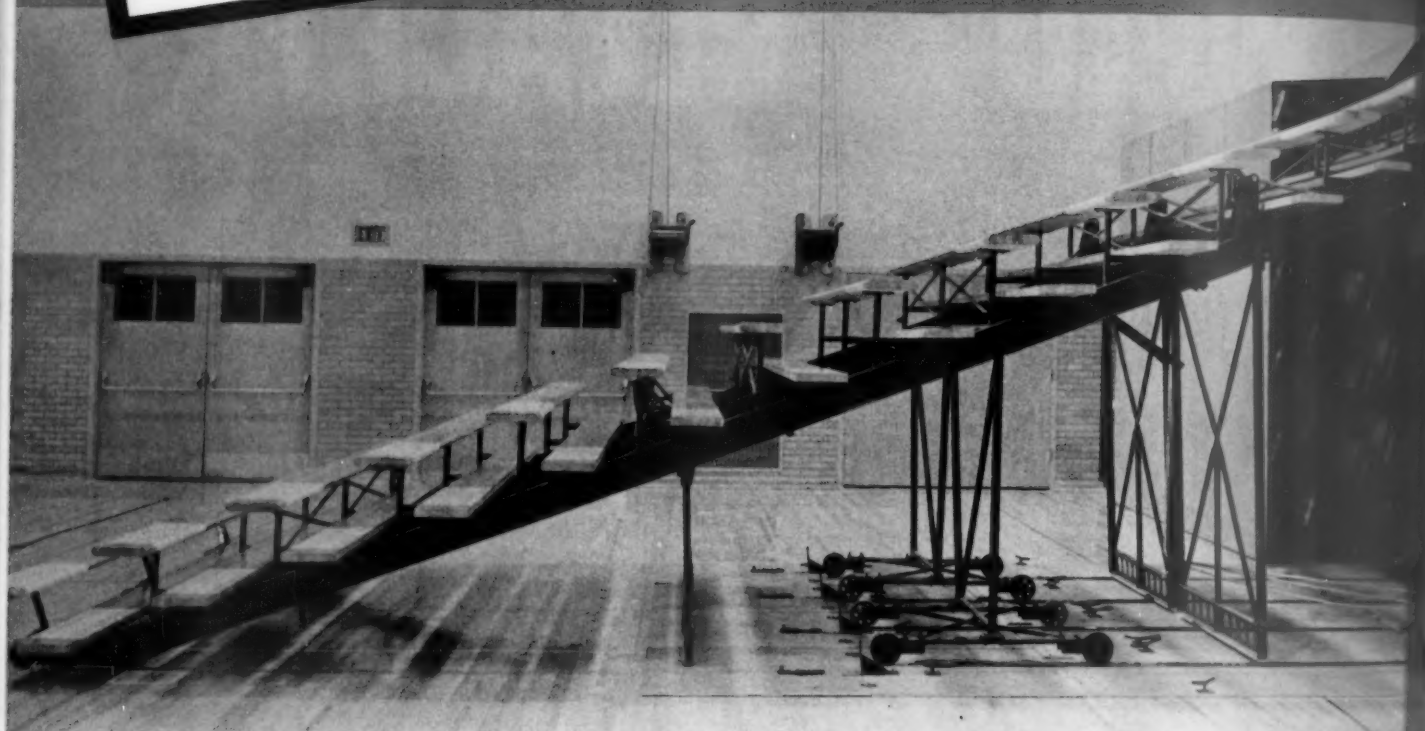
AMWELD® EASI-FOLD BLEACHERS

Sturdy – Safe – Easy-to-fold



Folds flat — out of the way

When not in use, Amweld Bleachers fold up against wall ... less wall and floor space than other bleachers.

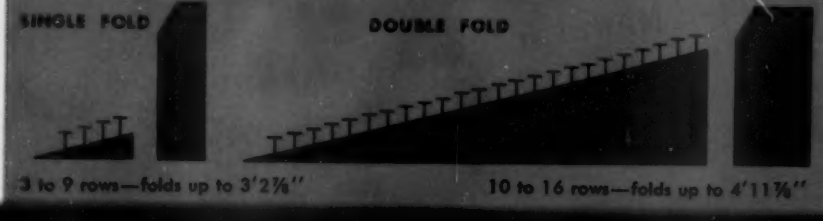


AMWELD® EASI-FOLD BLEACHERS

let you get more "use" time out of any room

Amweld Bleachers make the most of floor space. When not in use, entire bleacher folds up along wall, out-of-the-way, and can be completely covered to prevent injury to players. Within minutes, an entire gymnasium or other room equipped with Amweld Bleachers can be unfolded and ready for use. Operation is quick, safe and noiseless. One man can open or close. A gym or activities room takes on new dimensions when Amweld Bleachers are installed.

REQUIRES LESS FLOOR SPACE

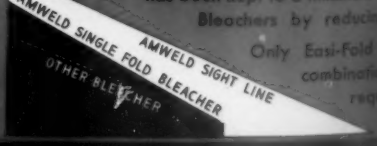


Tailor-Made to Individual Seating ...

With a rise of 13'⅛", Amweld Single Fold ... maximum visibility. The steeper angle of sight ... of playing floor — is especially well adapted ... on balconies.

Where greater seating capacity is required ... has been kept to a minimum in Amweld ... Bleachers by reducing the ...

Only Easi-Fold gives you ... combination ... requirements.





nder stand sweeping is easier

design and careful engineering have simplified under stand ation. Clear space under Bleachers makes for easy sweeping "cleaning up" after a big game. Provides area to hang and hats during the game.



One man can open or close

Carefully counter-balanced for easy operation, Amweld folding Bleachers roll out smoothly on Plaskite rollers. One man can operate either single fold or double fold Bleachers easily.

ore Seating Capacity

ectators sit naturally in 24″ seats. Spacing allows sufficient om for long-legged "teen agers" or adults. Sitting ith knees together, more paying customers can e seated. Rise of unit permits more vision.

afer In Use

signed to provide maximum safety for spectators, there e no loose or moving parts to pinch fingers or legs. use, load is transferred to the floor.

afer To Operate

hen opening or closing Bleachers, operator is safely front — does not have to crawl underneath and k possibility of injury.

n Be Locked — Open or Closed

ecial locking device locks and braces Bleachers in open ition—eliminating possibility of collapse when in use. closed position, Bleachers are locked to wall and er* can be locked in place by key to prevent tampering.

**Furnished in deluxe models only*

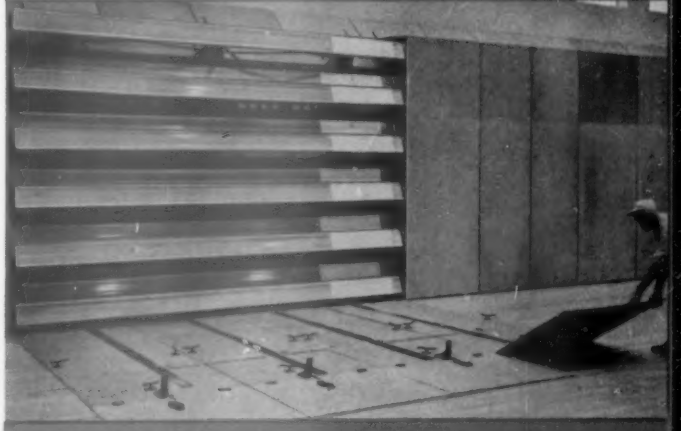
inimum Maintenance Required

mplified design and careful engineering have produced an y-to-operate Bleacher that requires only minimum intenance. Several hundred less operating parts go wrong.



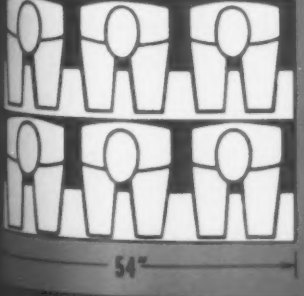
Sturdy I-beam construction

Heavy I-beams support structure. All steel welded construction means safe, trouble-free operation. No complicated slides, casters, or springs to wear out.

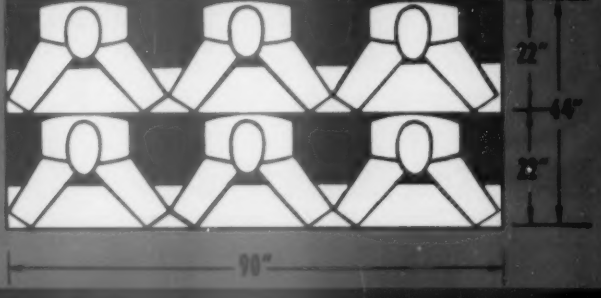


Complete floor protection

Floor protected when Bleacher is opened. Casters and vertical supports rest on wood—cannot mar expensive wood floors.



Full 24″ back-to-back seating actually *increases* seating capacity



Amweld®
EASI-FOLD
Bleachers

CONSTRUCTION SPECIFICATIONS

OPERATING PRINCIPLE

Bleachers shall fold in one continuous operation.

LOADS

Bleachers shall be designed to support a live load of 100 pounds per square foot of projected area and to withstand a sway load of 24 pounds per lineal foot of seatboard. Floor and seatboards shall sustain a load of 120 pounds per linear foot.

DIMENSIONS

Bleacners shall be ..... (wall attached or floor supported)*, and shall extend .... ft., ... in. when unfolded and shall fold to .... ft., ... in. for storage. Bleachers shall be .... rows, single fold (double fold) with 24" seat spacing.

*(Except mobile-type)

DESIGN AND CONSTRUCTION

Front face of bleachers in closed position shall be covered by ½" thick plastic faced plywood, hinged so as to lie on the floor during operation of the bleacher and to protect the floor from the rolling casters during unfolding.* Seatboards shall be of select structural grain, Douglas-fir or vertical grain laminated fir. Floorboards shall be of select structural grain fir. Under-structure shall be of steel and main stringers shall be steel beams.

Bleacher shall be designed so that maximum load is not resting on casters, but is transmitted to floor through vertical members supporting each section, when bleacher is in open position.

Convenient locks shall be provided for locking in both open and closed positions, without any bolting device or other fittings on the floor.

*(Amweld Deluxe Models only)

MOBILE TYPE

The above specifications also apply to the mobile type bleacher. In addition, the mobile type bleacher shall be designed so that "transporting" casters are attached as a permanent part of the bleacher itself. (Single fold units from 3 to 6 rows and double fold units from 7 to 10 rows are available).

ACCESSORIES

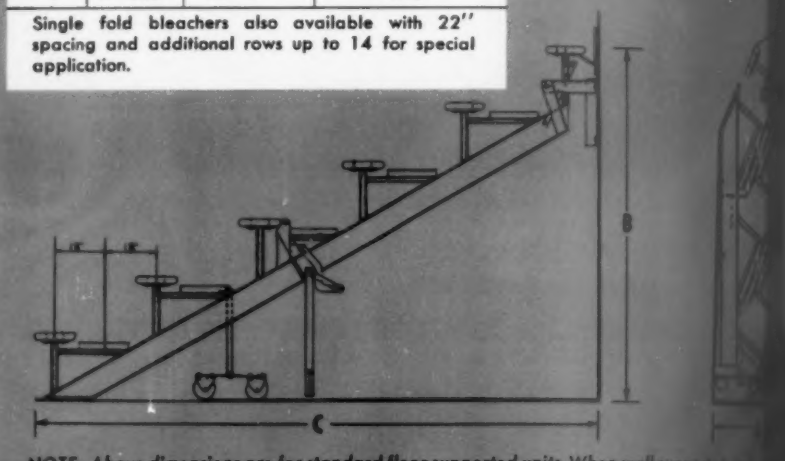
Scorers tables, hand rails, end covers for runs of bleachers and aisle ways are available.

24 INCH SPACING

Rows	Folded	Height to Top of Seat	Extended to Front of Front Seat
	A	B	C
3	2' 4⅝"	3' 4"	6'3⅛"
4	2' 5⅞"	4' 9⅜"	7'6⅜"
5	2' 9⅞"	5'11½"	9'6⅜"
6	3' 1⅞"	7' 1⅜"	11'6⅜"
7	2' 9⅞"	8' 3¼"	13'6⅜"
8	2'11⅞"	9' 5⅛"	15'6⅜"
9	3' 2⅜"	10' 7"	17'6⅜"

Single fold bleachers also available with 22" spacing and additional rows up to 14 for special application.

STANDARD SINGLE FOLD BLEACHER



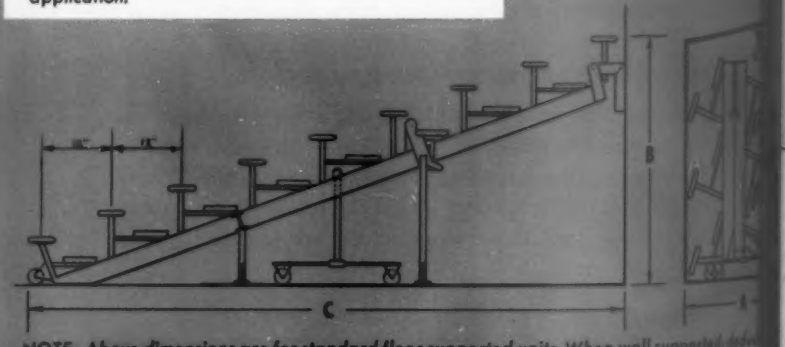
NOTE: Above dimensions are for standard floor supported units. When wall supported, ...

24 INCH SPACING

Rows	Folded	Height to Top of Seat	Extended to Front of Front Seat
	A	B	C
9	4'11⅞"	7' 0"	17'6¾"
10	4'11⅞"	7' 8½"	19'6⅜"
11	4'11⅞"	8' 5"	21'6⅜"
12	4'11⅞"	9' 1½"	23'6⅜"
13	4'11⅞"	9'10"	25'6⅜"
14	4'11⅞"	10' 6½"	27'6½"
15	4'11⅞"	11' 3"	29'6½"
16	4'11⅞"	11'11½"	31'6½"

Double fold bleachers also available with 22" spacing and additional rows up to 24 for special application.

STANDARD DOUBLE FOLD BLEACHER



NOTE: Above dimensions are for standard floor supported units. When wall supported, ...

Institutional Products Divisi

THE AMERICAN WELDING & MANUFACTURING

101 Dietz Road Warren, Ohio

BERLIN
SEATING
ENGINEERS



- Used primarily for indoor spectator seating
- Nests and folds against wall or into wall recess when not in use
- Saves valuable floor space for non-spectator activities

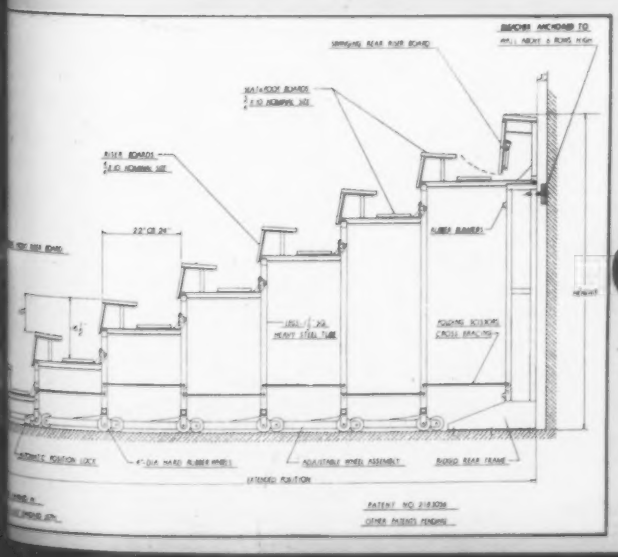
MECHANICAL - FOLDING

EZ-A-WAY
BLEACHERS

Write

For Catalog
For Complete Details
and
Full Specifications

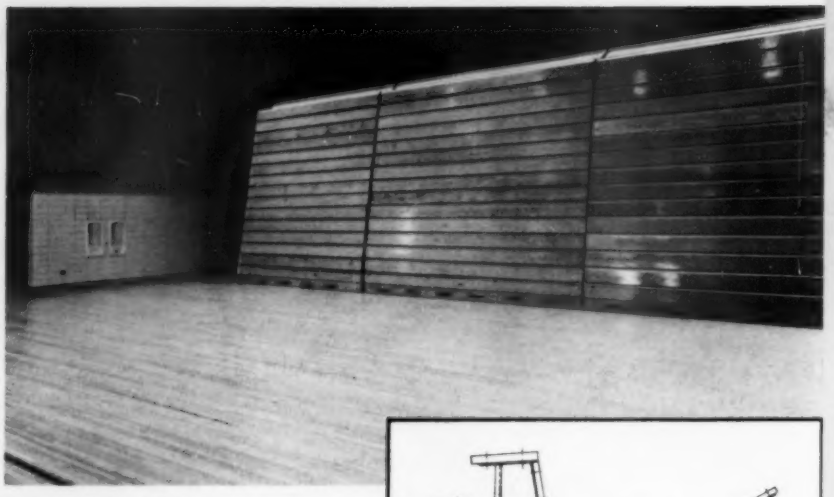
For over 46 years the Berlin Chapman Company has been in the field of specialized steel fabricating and are well qualified to design and install mechanical folding bleachers which will unconditionally meet with complete customer acceptance.

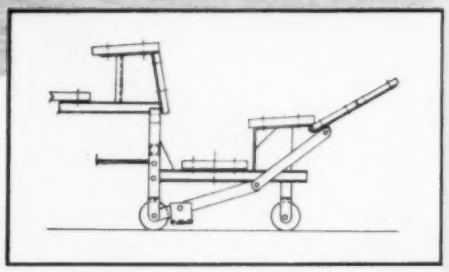


Also Mfg. all steel portable bleachers and permanent grandstands.

BERLIN CHAPMAN COMPANY

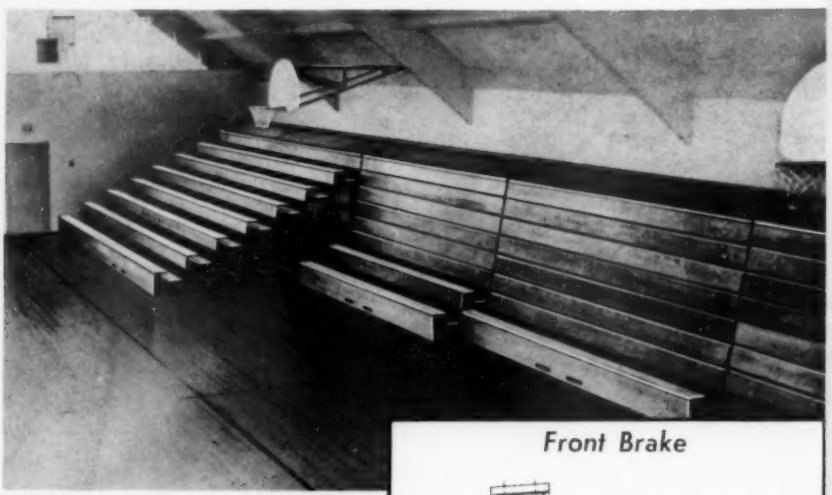
BERLIN • WISCONSIN



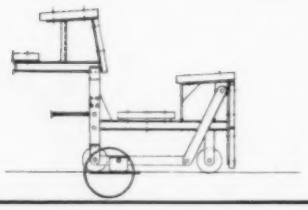


- Locking Device
- In Open Position
- When Front Riser Board is Raised the Bleacher is Free, and Opens and Closes With Famous Floating Action

EZ-A-WAY sections are built in standard 8, 12 and 16 foot lengths, yet are available in any dimension required to supply the desired seating arrangement. Flexibility of design and engineering know-how make this custom fabricating of EZ-A-WAY bleachers possible. Note that the Berlin EZ-A-WAY bleacher, especially in the higher installations, allows for greater floor space for intermural as well as physical education class use. Savings in floor space up to 85% can be realized.



Front Brake



FLEXIBILITY — One or more rows of EZ-A-WAY bleachers can be used in complete safety, Special locking device is a standard feature.

- **maximum floor utility — Bleachers nest back into each other, occupying as little as 2'9" when nested, providing maximum floor space when desired. If walls are recessed sufficiently, entire structure sets into wall, providing full wall to wall floor space.**

BERLIN
SEATING ENGINEERS

BERLIN, WISCONSIN

REPRESENTATIVES

ALABAMA
James A. Head & Company
2013 First Avenue, North
Birmingham, Alabama
Alabama School Supply Company
945 North McDonough Street
Montgomery, Alabama

CALIFORNIA
Mr. Howard Hill
1525 Powell Street
Oakland, California
Mr. Paul L. Schmidt
2136 Adair Street
San Marino, California

ILLINOIS
Sports Premium and School Equipment Sales Co.
4901-03 Oakton Street
Skokie, Illinois

IOWA
Ed Raftery
3401 Ingersoll
Des Moines, Iowa

KANSAS
Ron Bales Sales Agency
701 Commercial Street
Emporia, Kansas

KENTUCKY
Hunt's Athletic Goods Company
Mayfield, Kentucky

LOUISIANA
Frost-Parker, Inc.
560 Florida Street
Baton Rouge, Louisiana
School Products Company
2920 Chartres Street
New Orleans, Louisiana

MISSISSIPPI
Institutional Equipment Company
P. O. Box 8537
Jackson, Mississippi

MISSOURI
Athletic Supply Company
1110 East 47th Street
Kansas City, Missouri

NEW MEXICO
Wentworth Company
415 Copper Avenue, N.W.
Albuquerque, New Mexico

NEW YORK
U. S. Seating Company
570 Seventh Avenue
New York City 18, New York

OHIO
School & College Furniture, Inc.
Bedford, Ohio

OKLAHOMA
Mr. Olen Williams
Fair-Play
3512 N. W. 20th St.
Oklahoma City, Oklahoma

OREGON
Frank D. Cohan & Associates
1929 S. W. Sixth Avenue
Portland, Oregon

PENNSYLVANIA
Snellenburgs
Market, 11th & 12th
Philadelphia, Pa.

SOUTH CAROLINA
Mr. Jim Newton
P. O. Box 4021
Columbia, South Carolina

SOUTH DAKOTA
Hub City School Supply Co.
20 Third Avenue, S. E.
Aberdeen, South Dakota

TENNESSEE
Walsh-Leinart Company
306 Dome Building
Chattanooga 2, Tenn.

TEXAS
Modern Iron Works, Inc.
1600 East Missouri Street
El Paso, Texas
Don Davis Fine Building Materials
2815 — 28th Street
Lubbock, Texas
Wright Sporting Goods Company
223-227 North Main Street
San Antonio 5, Texas

UTAH
Mr. Edward Hanson
Logan, Utah

WASHINGTON
Frank D. Cohan & Associates
419 Third Avenue, West
Seattle 99, Washington

WISCONSIN (Southeastern)
Milwaukee Sporting Goods
312 West Wells Street
Milwaukee, Wisconsin

CANADA
Wood Industries Supply
1475 Crescent Street
Montreal 25, Quebec, Canada



G-1/cr

MAKE BIG POPCORN PROFITS for Your School with a Cretors

● A modest Initial Investment in a CRETORS Popcorn Machine Will Pay Your School Big Dividends for Years to Come

WHY YOUR SCHOOL SHOULD SELL POPCORN

● **BIG PROFIT ITEM . . .**
More than 8¢ out of every 10¢ you take in from popcorn is *profit!*

● **EVERYBODY LIKES IT . . .**
Popcorn is America's most popular snack item. And you can offer it to your students and friends with pride, because popcorn is wholesome and nutritious as well as good-tasting. Popcorn, in fact, is a well-balanced food, high in heat energy units, minerals, and other essentials of a well-rounded diet. It also supplies roughage and is recommended by dentists for between-meal snacks.

● **EASY TO POP AND SELL . . .**
No trouble to pop fluffy, crisp popcorn just like the professional concessionaires with a CRETORS popcorn machine. Any student can pop corn after a few minutes of simple instructions.

● **ENABLES STUDENTS TO EARN AND LEARN . . .**
Popping and selling corn gives students valuable business experience, teaches them the value of industry and enterprise, and furnishes them practical experience in making and handling money.

● **SCHOOLS HAVE AN ASSURED MARKET . . .**
If your school has an athletic program or any other crowd-gathering activities, you can sell popcorn. Popcorn and athletics go together just like pumpkins and Hallowe'en.

● **LOW INVESTMENT, HIGH RETURN**
No other business enterprise offers such a big return on such a small investment.

● **EASY PURCHASE TERMS . . .**
There are several ways to finance the purchase of a CRETORS popcorn machine without hardship. Write us for more details if this is a factor in your case.

WHY YOUR SCHOOL SHOULD BUY A CRETORS POPCORN MACHINE

BIGGER, FASTER POP-OUT . . .
With a CRETORS, you'll have plenty of popping and storage capacity to handle big crowds without missing a sale. According to independent comparative tests, CRETORS gives up to 39% more pop-out, up to 51% faster. That's *extra* performance that earns you many *extra dollars.*

MECHANICAL DEPENDABILITY . . .
CRETORS machines have an international reputation for mechanical dependability and long, trouble-free service.

A MACHINE FOR EVERY SIZE SCHOOL . . .
It isn't necessary to burden your school with a machine that may be twice as big as needed. CRETORS makes many different sizes and models. In the complete CRETORS line there is a size and model to fit your particular needs.

MADE BY WORLD'S PIONEER POPCORN MACHINE MANUFACTURER . . .
Every CRETORS popcorn machine is backed with almost three quarters of a century of popcorn-machine know-how. CRETORS is the world's pioneer popcorn machine manufacturer and developed most of the engineering advancements upon which today's popcorn business is based.

STYLING THAT SELLS . . .
Every CRETORS machine, from the sparkling "Ambassador" styled by Raymond Loewy to the handsome "America," was designed by experts with years of experience in impulse merchandising.

In this brochure are grouped some of the CRETORS popcorn machines that are more popular with schools. There are many other CRETORS models. If you do not find a machine here that fits your particular application, write us.



Big Machine Earning Power at a Medium Price in the NEW Cretors "HOLIDAY"

Here's the machine used by more schools than any other model. It's especially recommended for schools with enrollments up to 700.

The all-steel kettle pops 12 oz. of raw corn per charge or approximately $30.00 per hour and is similar in design to the ones used in the larger CRETORS models. It is equipped with an automatic thermostat that maintains proper popping temperature and prevents overheating.

The all-metal cabinet provides plenty of storage space, and has a cash drawer, tilt-out corn bin, and storage compartment for supplies.

One-piece yellow Lucite dome is illuminated from beneath . . . Stainless steel popper case bottom . . . Electric element under case keeps popped corn hot and fresh . . . Heavy-duty ball bearing casters . . . Hinged Plexiglass doors . . . Lower cabinet finished in white baked enamel with gay red stripes . . . Silk-Screen "POPCORN" sign adds flash and sales appeal.

BASIC SPECIFICATIONS: *Dimensions: 65½" high x 31" wide x 20⅝" front to back. 110V A.C. Total wattage: 1,750. Shipping weight: 245 lbs.*

CATALOG NO. H12E

Cretors COUNTER MODELS

LOW IN HEIGHT • HIGH IN PROFITS

CRETORS "HOLIDAY"

Counter Model

Identical to "Holiday" Floor Model except does not have lower part of cabinet. Has the same all-steel 12-oz. electric kettle, thermostatically-controlled, and the all-metal frame. Stainless steel popper case bottom uniformly heated by electric element . . . Polished aluminum waste corn separator . . . A cash drawer . . . Silk-Screen lettering on front and sides. Very popular with schools because of its earning power, and easily moved from one point of activity to another. Especially good for your concession stand in the gymnasium and football stadium, or for social events, and fund raising programs.



BASIC SPECIFICATIONS: *Dimensions: 42" high x 30" wide x 20" front to back. 110V A.C. Total wattage: 1,750. Shipping weight: 180 lbs.*

CATALOG NO. CH12E



BASIC SPECIFICATIONS: *Dimensions: 25½" high x 27" wide x 21" front to back. 110V. No special wiring required. Plugs into any ordinary outlet. Total wattage: 1,100. Shipping weight: 99 lbs.*

CATALOG NO. A6E

CRETORS "AMERICA"

Counter Model

A compact, colorful, high quality Cretors counter model that will enable your school to get in the popcorn business at the lowest possible cost. All-steel electric kettle, thermostatically-controlled, pops 6-oz. of raw corn per charge and can turn out $12.00 worth of popped corn per hour. Automatic lift kettle cover for greater animation and sales appeal. All-metal white frame with gay red top and blue sik-screen "Popcorn" sign. Perforated waste corn separator. Stainless steel popper case electrically lighted. Electric element under popper case bottom keeps popped corn hot and fresh. Very popular because of portability and ease of operation. Single painted panel door or plexiglass doors with magnetic catches optional at small extra cost.



here it is!

The "AMBASSADOR"

The World's Top Money Making Cabinet Model Popcorn Machine

styled by Raymond Loewy

If your school has over 700 students and a full athletic program, chances are you will need the extra earning power and sales appeal of this beautiful new CRETORS "Ambassador."

The all-steel kettle with replaceable heating elements pops 18 oz. of raw corn per charge or $50.00 in popped corn per hour. Another CRETORS feature is the 4-cubic-feet Elevator Well that permits your attendants to pop lots of corn in advance of rush periods. It holds the equivalent of 130 dime boxes of corn. Heated air forced throughout the stored popped corn keeps it hot, fresh, and crisp at all times.

The Automatic Seasoning Pump saves time, labor, and expensive popping oil and assures a uniform product. It delivers just the right amount of popping oil to the kettle automatically at the touch of a button. A separate and more detailed brochure is available on request.

BASIC SPECIFICATIONS: *Dimensions: 69" high x 36" wide x 30" front to back. 110/220 volt, 3-wire service. Total Wattage: 4,000. Domestic shipping weight: 500 lbs.*

CATALOG NO. XL-100

Cretors

SINCE 1885

• *Styled for Sales*

• *Engineered for Profits*

SALES OFFICES • POPCORN BUILDING

NASHVILLE 9, TENNESSEE, U.S.A.

Telephone • LD-179 Cable Address • CRETORS

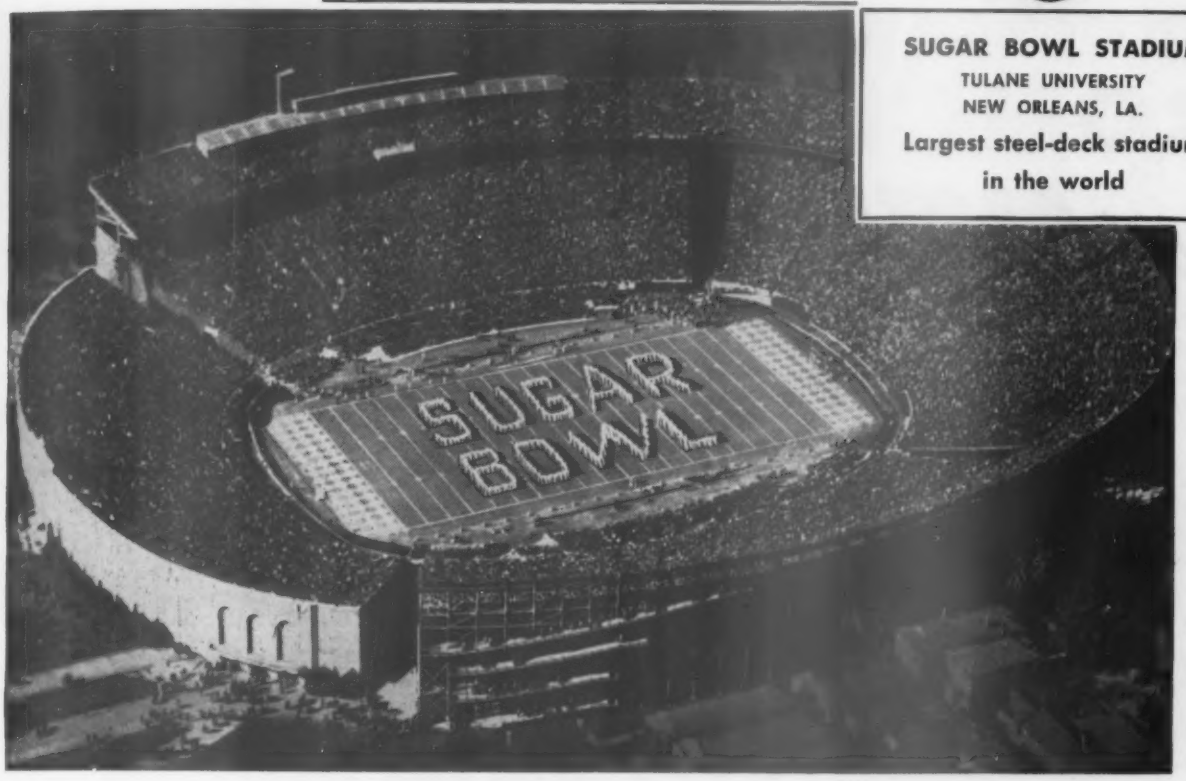
FACTORY • CHICAGO, ILL.

AMERICAN BRIDGE

AMERICAN BRIDGE DIVISION, UNITED STATES STEEL CORPORATION

General Offices: 525 William Penn Place, Pittsburgh, Pa.

ROANOKE • BIRMINGHAM • MEMPHIS • NEW YORK • ATLANTA • DALLAS



SUGAR BOWL STADIUM
TULANE UNIVERSITY
NEW ORLEANS, LA.
Largest steel-deck stadium in the world

STEEL-DECK STADIUMS and GRANDSTANDS —an economical answer to your outdoor seating problems!

If you need more and better seating facilities at your athletic field, consider the installation of a modern steel-deck stadium or grandstand. For steel-deck construction combines the inherent qualities of strength, safety and durability.

Steel-deck stadiums and grandstands cost less to build and less to maintain than other permanent types of construction.

They are easily adapted to any local requirement as to size and design... and to ground contour without extensive grading.

They are easy to extend by adding standard sections at the ends, or by double-decking with watertight steel plates which form a perfect roof for room facilities beneath the stadium for lockers, showers, class rooms, concession booths, etc.

Simplicity of fabrication and ease of erection assures quick completion.

American Bridge steel-deck stadiums and grandstands are the product of more than thirty years of technical and practical experience in this specialized field of construction. Every job is scientifically plotted and designed for maximum spectator comfort and convenience . . . and economy to the owner. Our engineers are at your service for free consultation. Cost estimates furnished without obligation for definite projects. Address your inquiry to our nearest office.

A Few of the Many STEEL-DECK STADIUMS by AMERICAN BRIDGE

Sugar Bowl—Tulane University, New Orleans, La.
Orange Bowl (original) Miami, Florida
Gator Bowl, Jacksonville, Florida
Purdue University Grandstand (addition)
Yankee Stadium, Bronx, New York City
Polo Grounds Grandstand, Manhattan, New York City
Will Rodgers Stadium, Broadmoor, Colo.
Cleveland Municipal Stadium, Cleveland, Ohio
Forbes Field Grandstand, Pittsburgh, Pa.

INTERESTING COLOR MOVIE FOR FREE SHOWING

The sound and color motion picture—BUILDING FOR THE NATIONS—a factual, photographic record of the highlights of the fabrication and erection of the United Nations Secretariat Building in New York, is available for showings in schools, clubs, churches and industries. For free bookings, write our Pittsburgh office.

CASTADIA INC.

2242 N. 35th St., Milwaukee, Wisconsin

NOW any School or Community Can Have a Beautiful Permanent CONCRETE STADIUM with CASTADIA

Yes, by use of pre-cast sections of concrete, a stadium to fit your particular needs can be built at remarkable savings in time, cost, and upkeep over the years.

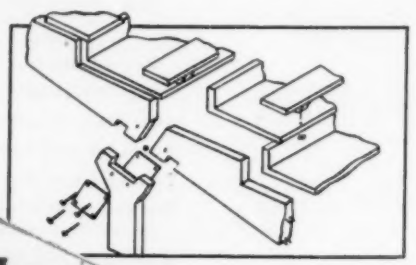
Check These 8 BIG Advantages

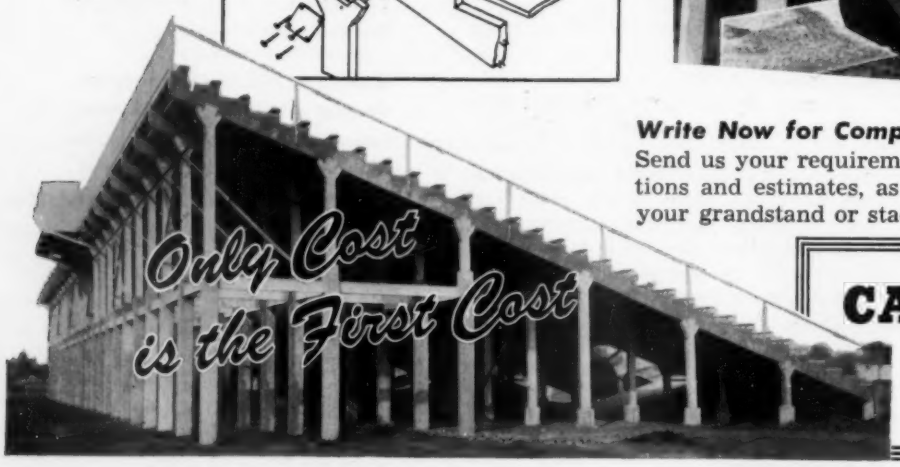
1. **LOW CONSTRUCTION COST** — "Castadia" cost approximately half the amount for monolithic construction and are priced competitively with permanent steel stands.
2. **LOW MAINTENANCE COST** — Made of durable concrete and requiring no painting, "Castadia" need practically no maintenance.
3. **QUICKLY CONSTRUCTED** — "Castadia" go up in less time than other permanent seating structures.
4. **EXTRA FACILITIES**—"Castadia" may be enclosed underneath for showers, dressing rooms, concessions, restrooms or storage.
5. **FIREPROOF** — and of proven structurally safe design.
6. **FLEXIBLE**—"Castadia" can be expanded by increasing height or length to adjust to larger future needs.
7. **WARMER AND MORE COMFORTABLE** — 30 inch treads allow ample leg room — and there are no cold drafts blowing through the stands.
8. **CLEANLINESS** — Waste trash can't fall through and collect under the stadium.





Exploded view of Castadia Construction





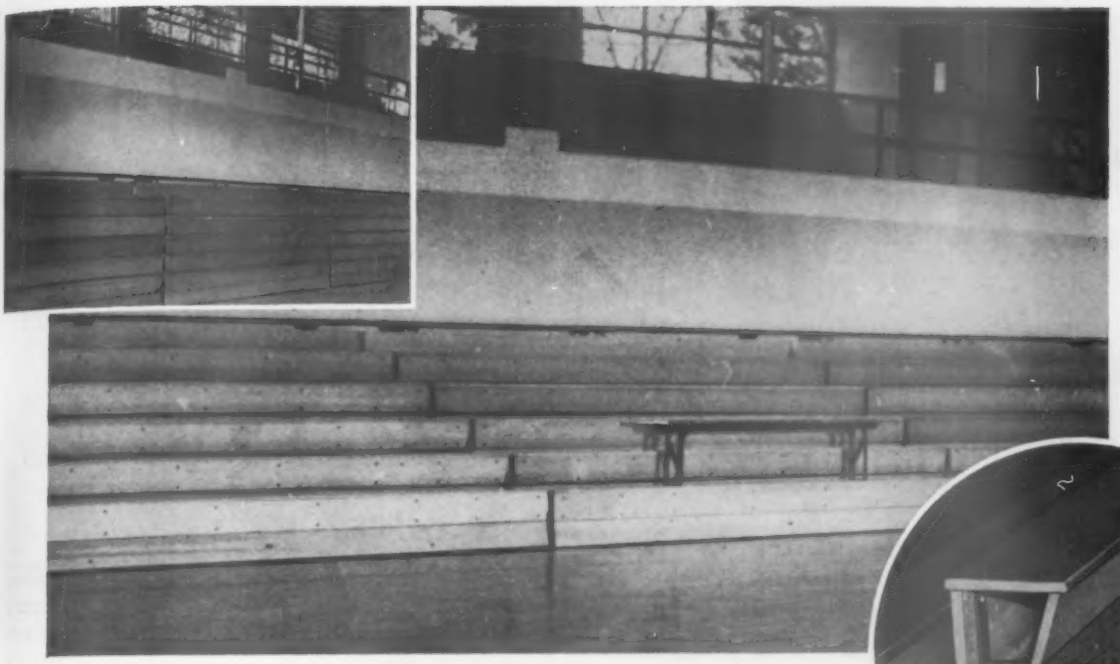
Write Now for Complete Information on "CASTADIA"

Send us your requirements and we will make recommendations and estimates, as well as furnish layout planning for your grandstand or stadium.

CASTADIA INC.
2242 N. 35th St.
MILWAUKEE, WISCONSIN

HUSSEY MFG. CO., INC.

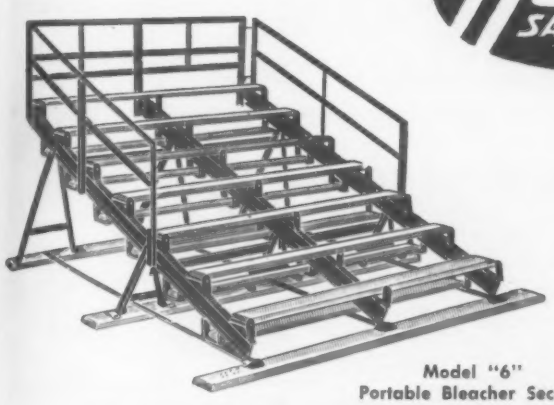
NORTH BERWICK • Ironworkers Since 1835 • MAINE





ALL ENCLOSED DECK

You can have *all* the advantages when you select HUSSEY SAFE SEATING "ROLL OUTS"



Model "6"
Portable Bleacher Section

SEATING SPECIALISTS

Hussey has long been recognized as specialists in all types of outdoor and indoor seating. Their low cost, patented, portable steel bleachers (can be used both indoors and outdoors) are leaders in this field. Hussey also builds permanent, steel grandstands for athletic fields, race tracks, municipal bowls, etc.

There are several excellent types of "pull-out" gym stands on the market, but only the new Hussey "Roll Outs" give you *all* of the advantages available in this type of seating.

The above photographs, taken at River Grove School, River Grove, Ill., illustrate the Hussey exclusive "All Enclosed Deck" that prevents collection of waste or loss of articles under the stand, eliminates fire hazard, facilitates cleaning and makes a Hussey "Roll Out" a comfortable grandstand rather than a bleacher. In addition, special Hussey construction makes it possible for one person to easily open or close the stand without binding or jamming even when the pressure is applied near the end. In Hussey "Roll Outs," motorized "push button" operation is also available at additional cost.

If you want the best of seating for your new gym, ask your architect to get Hussey "Roll Out" specifications—FREE illustrated folder on request. Ask for your copy today.

Write for FREE catalogs to—Hussey Mfg. Co., Inc., 5515 R.R. Ave., North Berwick, Me.

OTHER FAMOUS HUSSEY PRODUCTS

Adjustable, Sectional, Steel Landing Piers; Permanent, Steel Landing Piers; Diving Boards; Floats; etc.

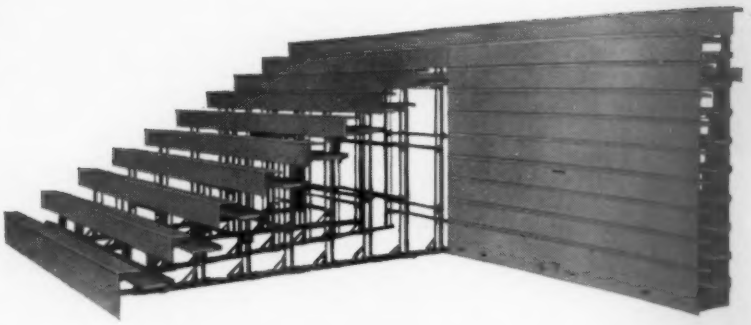
FRED MEDART PRODUCTS, INC.

3550 DeKalb St., St. Louis 18, Missouri

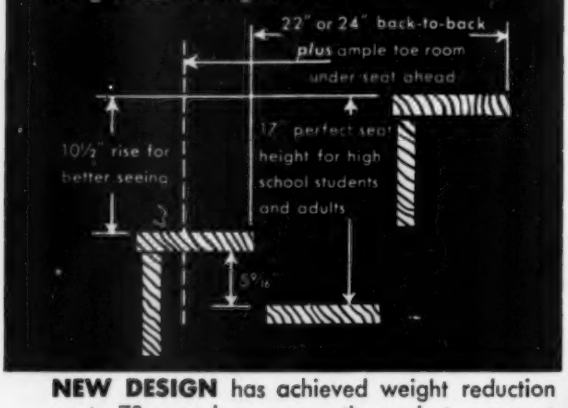
SALES ENGINEERS IN ALL PRINCIPAL CITIES

MEDART

TELESCOPIC GYM SEATS



TWO DEPTHS . . . 22" row depth for maximum seating capacity—24" row depth for greatest seating comfort.

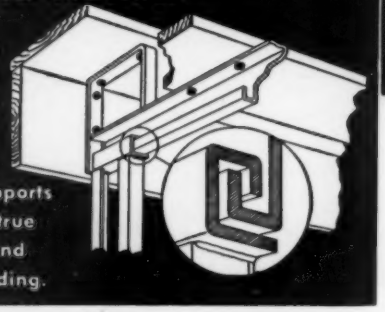


NEW DESIGN has achieved weight reduction up to 70 pounds per row—the easiest gym seat to open and close.

SELF-SUPPORTING understructure now stronger than ever—wood parts give *additional* strength.

4 VERTICAL UPRIGHTS support each row—controlled weight distribution—no extra wall reinforcing required.

"FLOATING MOTION" opening and closing assured by interlocking members and multiple supports that insure true alignment and prevent binding.

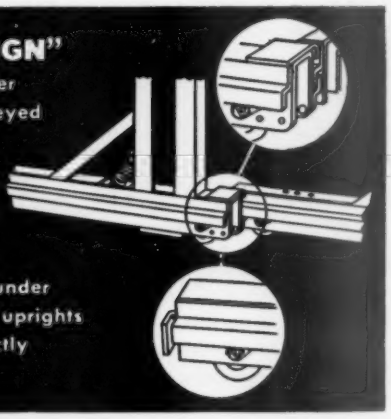


The economy, convenience and revenue-producing value of Medart Telescopic Gym Seats have been proved by completely satisfactory installations in thousands of schools and colleges. In comparison with fixed seating, telescoping seats not only cost much less, but provide equal usable floor space for normal class use in far smaller structures, thus saving substantial sums in building costs.

Medart Telescopic Gym Seats virtually pay for themselves, plus a sizable portion of the athletic program, by accommodating maximum audiences at the least cost, and within a few minutes. Janitor time is less too, because with Medart Seats, clean-up is easy. And Medart Seats are convenient. One or two persons can quickly open and close them with minimum effort.

Whether installed in existing or new buildings, against the wall or recessed, or on both balcony and main floor, Medart Seats return the total investment in a short time, and keep paying worthwhile dividends year after year.

"DUAL-ALIGN" cushioned roller housing are keyed together and interlocked for straight-line trackage. Non-marring rollers retract under load—vertical uprights then bear directly on floor.



Write For Catalog

MOVABLE SEATS Compact, easy-to-handle, readily-stored. Perfect in structures where wall-attached or recessed seats are impractical.

2-LEVEL SEATS Wall-attached or movable type for installation on balcony and main floor provide maximum seating capacity, but "recover" virtually all floor space for normal class use.

RECESSED SEATS Free entire floor area when closed. Recess of adequate depth and height required in new buildings, plus provision for anchoring.

FRED MEDART PRODUCTS, INC.

MEDART BASKETBALL BACKSTOPS



OFFICIAL FAN-SHAPED GLASS

Made of Herculite tempered glass, Neoprene cushioned and permanently mounted in double-angle, welded metal frame. Quickly replaces the Medart fan-shaped official steel backboard. (NOT SHOWN) Medart's Official world-famous fan-shaped steel backboard, built of a single 10-gauge steel shell, channel reinforced.

Medart offers not only a complete line of Basketball Backstops but also the engineering assistance to choose the *RIGHT* Backstop, to assure that it is correctly "tailored-to-the-job" to meet all structural conditions, and to make certain that it is properly erected to give the maximum in rigidity, permanence and freedom from vibration.

Whether of steel, glass or wood, Medart Backboards will not splinter, buckle, wear or distort in any normal climate or atmospheric condition. All are skillfully engineered and fabricated, and rigorously tested to provide the most in durability and strength. And every one conforms to the Official Standards of the National Basketball Committee.

Write for Catalog

OFFICIAL RECTANGULAR GLASS

Made of ½" Herculite tempered glass. Sturdy, rigid metal frame. (NOT SHOWN) Medart's ruggedly framed, thick plywood rectangular backboard—a favorite for practice play.



MEDART BASKETBALL SCOREBOARDS



No. 3500 SELEKTOR ® SCOREBOARD

No other scoreboards made surpass Medart's for easy, simple, rapid operation, superior engineering, quality of materials, expert workmanship, and long trouble-free service. Specially designed numeral blocks for highest visibility. Extra care in design and fabrication assure positive accuracy.

Write for Brochure

12½" x 7" lighted plastic number blocks—Quick reset for periods from 20 to 15 minutes, then down to 1—Automatic Timing shows play time in seconds—Push Button Scoring—Automatic Signalling. 6'6" x 4'2". Reinforced steel. Services from front.

Fast push button reset—27" translucent face lights when timer is on—Dead stop brake for time out—8½" tall numerals, tested for high visibility—Automatic horn sounds end of period—Push button controls for all signals. 6'2" x 3'6". All steel, black wrinkle finish.



No. 1025 CLOCK TYPE SCOREBOARD

NO. 1025 CLOCK-TYPE SCORER & TIMER

MEDART GYMNASIUM APPARATUS







Medart is the largest and most complete source anywhere for gymnasium equipment! Built into every item of apparatus is 78 years of experience in the manufacture of the finest equipment available. Acceptance of Medart by thousands of leading schools, colleges and gymnasiums, by the U.S. Armed Services, Olympic Games and championship meets all over the world is ample testimony of Medart quality and design which meets or exceeds every Official Standard.

Write for Catalog

MEDART'S COMPLETE LINE INCLUDES:

- Side and Vaulting Horses
- Parallel Bars
- Horizontal Bars
- Swivel Flying Rings
- Climbing ropes, poles & ladders
- Pond-Medart Twisting Belt
- Stall Bars
- Resistance Machines
- Mats & Mat Trucks
- Boxing Rings and equipment
- Vault, jumps & game standards
- Rowing Machines
- Pulley Weights
- Physical Therapy equipment
- Anthropometric equipment

—and virtually every other item desired for physical training.

LONG ISLAND BLEACHER CO., INC.

33–35 9th Street, Long Island City 6, N. Y. RAvenswood 8-4467

Designers, Manufacturers and Erectors of Steel Grandstands
Permanent and Portable Bleachers, Telescopic and Jack Knife Gymstands

Start Planning Now with L.I.B.

If you are planning for new bleachers—or additions to existing equipment—discuss your needs with L.I.B.

The engineering staff with more than 30 years of practical experience in the design, manufacture and erection of indoor and outdoor steel seating equipment is ready to put this knowledge to work for you—to help you select the type bleacher best suited to your needs and budget. Our experience ranges from the manufacture and erection of double-deck and large canopied stadiums seating up to 20,000, down to the smallest portable bleacher.

Comfort and Visibility

On all types of L.I.B. Bleachers, both portable and permanent, there is sufficient room between rows to permit free leg room. Footboards are 16 inches wide, providing sufficient walking space, and because the above seat board overhangs, there is no open space for spectators to slip through. All seat boards join flush-at-ends, no uneven bumps or chance of being pinched. A rise of nine inches between seatboards provides ample and unobstructed visibility.

Portable Bleachers Require No Foundations

Being constructed in easily handled sections, with simple construction principles, these bleachers are easily and quickly erected by unskilled labor. They can just as quickly be taken down, and can be compactly stored. Specially designed Angle Bents and Stringers automatically adjust themselves to uneven terrain, and no special foundations are required.

Length and height are easily increased because all sections are standard and inter-changeable, height or length can be increased by adding additional material.

Eight Points To Be Considered When Purchasing A Bleacher

1. Safety; 2. Comfort; 3. Life of Bleacher; 4. Insurance Rate; 5. Re-Sale Value; 6. Assembly and Erection; 7. Adaptability; 8. Appearance. ALL EIGHT of the important features outlined above are found in L.I.B. SAFE STEEL BLEACHERS.

Safety

The sections of all L.I.B. Portable Steel Bleachers are 12-16-18 feet long, and steel supports occur every 4' 6". As mentioned previously, the strength of all steel meets rigid specifications. Correct engineering design prohibits side-sway and because all parts interlock, the heavier the spectator load, the greater the compactness of the structure. Every bleacher is constructed to hold four times the given load.

In the many years that L.I.B. bleachers have been in use, there has never been an accident due to faulty construction.

Specifications for Portable Bleachers

Bleachers are designed to support, in addition to their own weight, a live load of 120 pounds per linear foot of seatboards, plus 120 pounds per linear foot of footboards, and to withstand a side sway load of 24 pounds per linear foot of seatboard and a front-to-back sway load of 10 pounds per linear foot of seatboards. Under these loads stresses in steel shall not exceed those specified by the American Institute of Steel Construction, and stresses in wood shall not exceed those specified by the U.S. Forest Products Laboratory, and are so constructed that they will conform to inequalities in the ground without increasing stresses beyond the limits specified, and without jeopardizing the stability of the structure or the safety of its occupants. Seat boards 2" x 10", Foot Boards, Two 2" x 8", Select Structural Oregon Fir, Kiln Dried.

Stringers—Stringers shall be channel steel, not less than 5-in. channel. Bottom end of stringer shall have bearing plate welded to same for resting on the floor or ground.



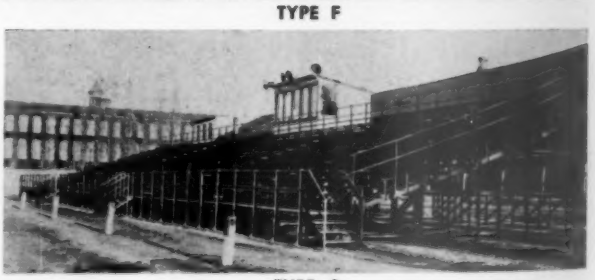
JACK KNIFE BLEACHER



11 ROW TELESCOPE GYM BLEACHER



TYPE F



TYPE C

Seat and Foot Board Supports—Supports shall not be less than 2 x 2 x 3/16-in. steel angles, riveted to stringer, forming one complete unit. Tops of angle support shall be slotted to receive lip of locking device.

Seat and Foot Boards—Seat and foot boards, Oregon fir, dressed 4 sides. Each have 4 patented Sta-Tight latches to secure same to steel supports. There are no loose bolts or removable parts to this foolproof lock. Easy to erect and take down. Note latch and slotted angle connection.

Bents—Bents shall consist of two vertical struts of 2½ x 2½ x 3/16-in. angle steel, braced horizontally and diagonally to insure rigidity against side-sway, tops of each strut shall have proper provision for receiving stringers. Bearing plates, 6 x 6 x ¼ in. to be welded to foot of each bent, for resting on floor or ground. Horizontal and diagonal braces to be not less than 2 x 2 x 3/16-in. steel angles, and shall be welded to struts.

More for your money in a Long Island Bleacher.

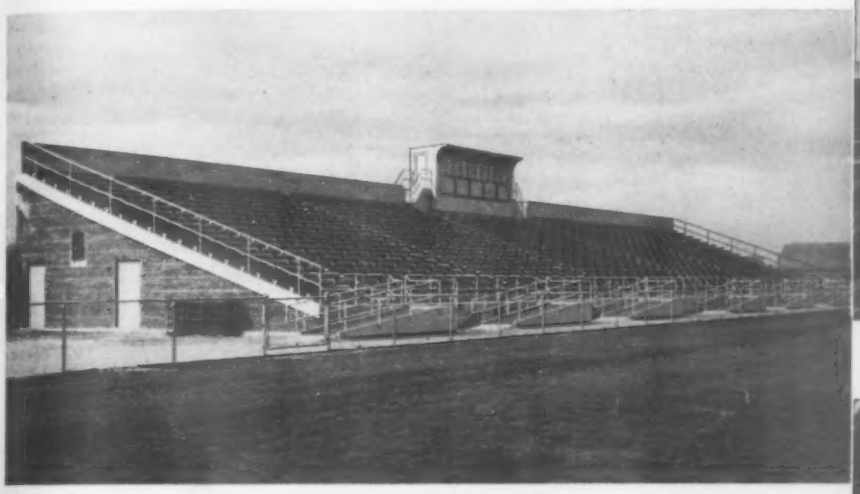
PITTSBURGH-DES MOINES STEEL COMPANY

Plants at PITTSBURGH, PA.—DES MOINES, IOWA—SANTA CLARA, CALIF.

Sales Offices at

Pittsburgh (25), 3425 Neville Isand • Des Moines (8), 924 Tuttle St. • Newark (2), 294 Industrial Office Bldg. • Dallas (1), 1224 Praetorian Bldg. • Chicago (3), 1215 First National Bank Bldg. • Los Angeles (48), 6399 Wilshire Blvd. • Seattle, 515 Lane Street • Santa Clara, Cal., 614 Alviso Road

STEEL DECK GRANDSTANDS





Weathertight steel decks provide useful sheltered space below.



Serving schools and colleges from coast to coast, Pittsburgh-Des Moines Steel Deck Grandstands offer the maximum values in safety, comfort, permanence and fine appearance. These Grandstands, with their unique system of unitized construction, make possible complete flexibility in design, plus speed and economy in erection. The original installation may be either large or small, since the unitized design includes provisions for adding sections at any time to increase capacity in width, depth or both. Stands may be built along one, two, or three sides of the field, or may completely surround it. Assembly may be by bolting or welding. If assembled by bolts, the stands may be dismantled and re-erected at a new location if desired.

WEATHERTIGHT DECKS

Weathertight steel decks are an important design feature of Pittsburgh-Des Moines Grandstands. Supported by heavy steel under-bracings, they provide a weathertight underdeck space which may be utilized for dressing rooms, toilet facilities, storage space, etc. If desired, the underdeck area may be totally enclosed by the construction of masonry walls along the ends and back of the stands. These Grandstands are furnished complete with guardrails, steps or ramps, and built-in press box, if specified. The wood seat planks are supported by cast iron or welded steel stools which are bolted to the deck. Other types of seating also can be furnished.

SIZE AND SEATING CAPACITY

Pittsburgh-Des Moines Steel Deck Grandstands may be any length, and any number of rows deep. For economy, however, we recommend that the length of the stand be 15 or 15 plus any multiple of 8 (such as 23, 31, 39, etc.).

Seating capacity of a grandstand, with due allowance made for aisle space, may be calculated as follows:

Basis 16½" seat widths $S = R \times L \times 2/3$

Basis 18" seat widths $S = R \times L \times 11/18$

Where S is seating capacity of stand

R is number of rows in stand

L is length of stand in feet.

ECONOMY FEATURES

Since they have the permanence of steel, these Grandstands are a lifetime investment. They will not weaken or collapse, for they cannot rot or decay. The initial cost is relatively low, and the salvage factor also is an important consideration. An occasional coat of paint is all the maintenance necessary to keep them new-looking year after year.

Without obligation a Pittsburgh-Des Moines representative will be glad to consult with you on your future plans, and to provide any desired assistance.

P-DM Steel Deck Grandstands are illustrated and described in detail in a 20-page catalog. May we send you a copy?

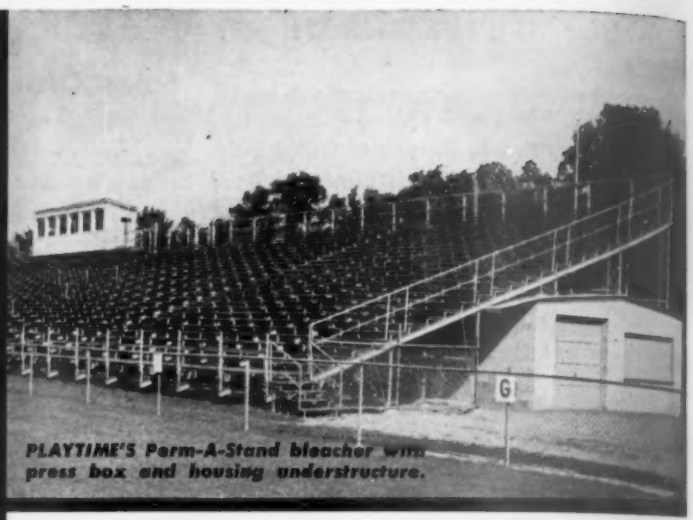
PLAYTIME EQUIPMENT CORP.

Mars, Pennsylvania

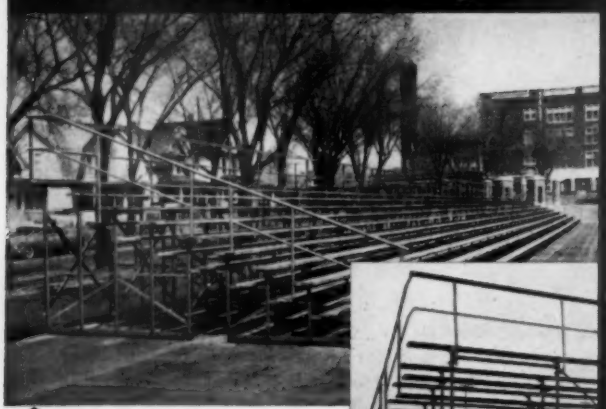
Playtime

- **PORTABLE BLEACHERS**
- **PERMANENT STANDS**
- **MOVABLE RISERS**

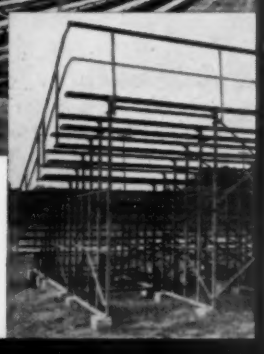
"They Cost You Less and Last You Longer"



PLAYTIME'S Perm-A-Stand bleacher with press box and housing understructure.



10-row section of Dur-A-Bilt portable bleachers on location.



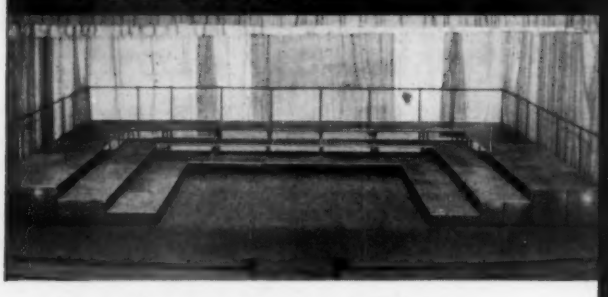
Rear view of Dur-A-Bilt bleachers showing attachment to concrete piers.

With PLAYTIME products, it's the panel that makes the difference. These load bearing members are of one-piece all-welded construction — test proved more rigid under full load bearing conditions. This feature also provides simplified assembly, minimum leveling adjustment, and relocation of portable units without dismantling. Where grandstand-type seating is required, PLAYTIME's Dur-A-Bilt Bleachers or Perm-A-Stand can be set on concrete piers. The full PLAYTIME line is available as individual or continuous units, elevated or ground flush, 3 to 30 rows in height.

COMPONENTS

Panels and Braces:	¼" angular steel
Bases:	Perm-A-Stand — 6" channel Dur-A-Bilt — 2" x 2" x ¼" steel angle
Foot and Seatboards:	Treated, select Douglas Fir, enamel coated
Fastenings:	Bolts, nuts, clips, etc. — galvanized steel
Skids:	Treated Oak bolted to panels
End Rails:	Heavy wall tubular steel

PORTABLE RISERS



EXCLUSIVE—they're GALVANIZED

To defeat the costly ravages of rust on steel members, PLAYTIME offers its full line of bleacher seating HOT-DIP GALVANIZED **after fabrication.** Zinc coating by this process is the best method of stopping rust once and for all.

FOR CHORAL GROUPS ORCHESTRAS—MOVABLE STAGES

Included in the PLAYTIME line is this all-welded steel Portable Riser—ruggedly built, yet easy to handle in units 4' wide. By use of our exclusive bracket type brace, old fashioned, time consuming methods of attachment are eliminated.

"FOR YOUR GAME SEATING COMFORT"

Playtime

EQUIPMENT CORP., MARS, PA.

Send for FREE descriptive literature, recommendations or quotations. Distributors in all leading cities.

SAFWAY STEEL PRODUCTS, INC.

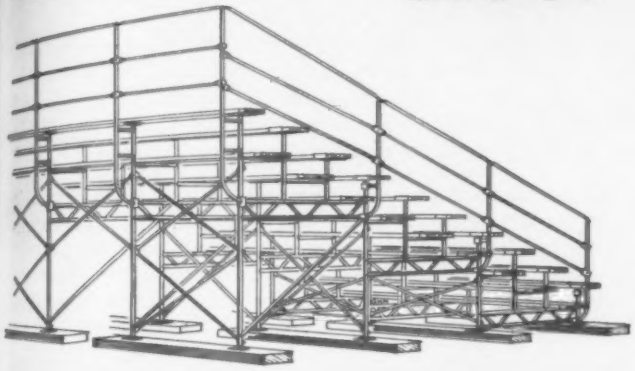
6229 W. State St., Milwaukee 13, Wis.

Manufacturers of Tubular Steel Scaffolding, Grandstands, Bleachers and Other Steel Products

DISTRIBUTORS IN PRINCIPAL CITIES

Permanent and Portable

Steel GRANDSTANDS and BLEACHERS ...Engineered BY SAFWAY



(Below) Typical Safway Portable Steel Bleacher Section—Each basic unit is 6 ft. wide by 6 ft. deep and provides 3 rows of seats. More sections are added at sides and back to obtain required capacity.



Over 12,200 people watch baseball and football games from these Safway stands located on the East coast. This grandstand-bleacher assembly provides unexcelled play by play visibility. Knee bracing plus horizontal and vertical cross bracing gives uniform, well-distributed strength.

For permanent or temporary seating structures, either outdoors or inside. Stands of any required length, depth or shape may be assembled rapidly from standard Safway parts. Unskilled help can handle this job without special tools. The simple construction of individual members and the complete stand keeps erection costs at a minimum; Safway's *engineered design* provides incomparable safety.

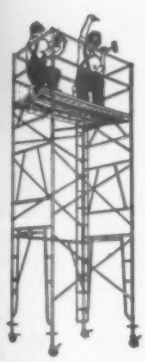
- ***ENGINEERED DESIGN***—Sturdy tubular steel frame members are made with close tolerances to assure rigid joints. Cross braces secured with studs and wing nuts; sections added in height and depth with coupling pins. Simple fasteners hold seat and floor planks securely.
- ***MAXIMUM PORTABILITY***—Erection time minimized by interchangeability and convenient size of Safway parts. Dismantling and storage equally easy; parts may then be re-used in the same *or any other form*. More sections or rows can be added at any time.
- ***MAXIMUM SAFETY***—Rigidity and structural unity of complete stand is assured by Safway design. Heavy loads and sudden crowd strains distributed evenly throughout framework by system of *continuous cross bracing*. No independent towers, A-frames or stringers.
- ***SUPERIOR VISION***—Every seat *a good seat*. Steep pitch of not less than 8½″ rise between seat rows permitted by inherent strength of tubular members and Safway engineered design.

WRITE FOR ESTIMATE

Write Safway, at address given above, for additional information. Include dimensions of space available and seating capacity desired. We will assist in working out your bleacher problems and will furnish an estimate suited to your specific requirements.

BUILDING MAINTENANCE EQUIPMENT

Steel or New Aluminum Rolling Work Towers



(*Illustrated at left*) Follow progressive work—may be used indoors or outside. Casters lock at work location. Towers are easily assembled to height and shape required for the individual job. Now available in both tubular steel and new lightweight aluminum equipment.

Safway Hydro-Lift

One-man rolling work tower. Lift raises from 7 to 17 ft. on hydraulic ram, operated by worker from platform. Tower telescopes to clear small doors, 30 in. wide by 84 in. high.



(Right) Small Safway Bleacher—Provides 720 seats for Rotary Club, Wayne, Mich. Used for football and other events.

SICO GRANDSTANDS, INC.

3577 Wooddale Ave., Minneapolis 16, Minn.

...Manufacturer of a complete line of STEEL BLEACHERS and GRANDSTANDS



Sico 10-Row Permanent Bleacher



Sico 20th Century Elevated Grandstand



Sico 3-Row Gymnasium Stand

For specifications and complete details write:

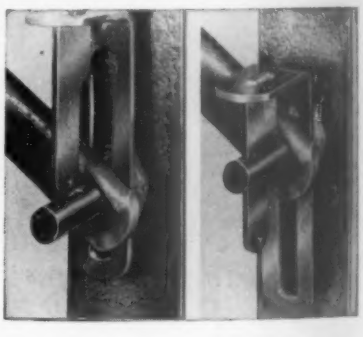
Sico permanent bleachers offer top spectator comfort and safety at lowest initial and upkeep cost. Their flexible design permits installation on hillsides or uneven ground and as seating requirements grow, they are expandable in either length or depth without modification.

Sico permanent grandstands, like Sico bleachers, provide maximum comfort, safety and long life. Aisles and stairways on standard and elevated units can be located wherever needed. Easily expandable. Sico engineers aid in preparing installation and layout prints for all units without charge.

Easily erected Sico portable bleachers (the heaviest part weighs only 90 lbs.) make multiple use possible—inside for basketball and outside for track, baseball and football. Smaller Sico 3-row gymnasium stands can be set up in minutes and will often pay for themselves in as few as five paid admissions per seat!



Sico safety has been proven in tests conducted by independent testing laboratories. *Loads up to 695 pounds per seat* and forces equivalent to winds of *170 MPH* were imposed on Sico bleachers without sign of structural failure. High grade structural steel and select Douglas fir assure long life with maximum strength.



Sico Speedlock is simple — drops into place to form a positive, rustproof, practically indestructible locking device. Assembly and disassembly time of portable bleachers is cut drastically by eliminating nuts and bolts which often jam or rust.

Manufacturers of permanent and portable bleachers and grandstands and portable choral risers.

SICO GRANDSTANDS, INC.

3577 Wooddale Avenue, Minneapolis 16, Minn.

UNIVERSAL BLEACHER COMPANY

Roll-A-Way and Fold-A-Way Gymnasium Stands—Portable Wood and Steel Grandstands

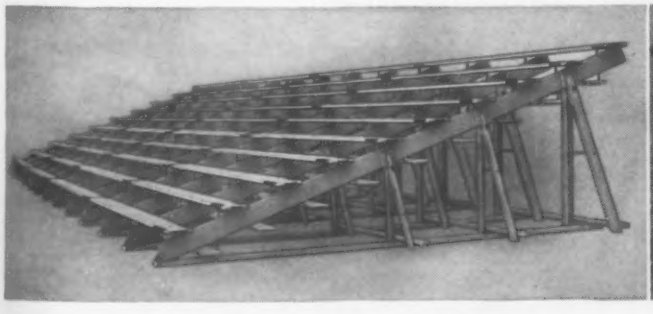
606 South Neil Street, Champaign, Illinois



UNIVERSAL BLEACHER COMPANY *is the oldest and largest manufacturer exclusively devoted to the design and construction of bleachers and grandstands. Starting with the first bleacher made (30 years ago), safety has been the keynote in every step of the* Universal *design and manufacturing process . . . a rigid principle which never has and never will be changed.*

Universal Roll-A-Way Gymnasium Stands

Carefully engineered and custom-built to meet your specifications, *Universal* Roll-A-Way Gymnasium Stands are ideal for large capacity or small. They are compact, yet provide more cubic inches of comfortable leg room below seat board levels than any other stands . . . with either 22″ or 24″ row spacing. When not in use, they may be folded back to walls, providing approximately 70% more floor space for regular gymnasium activities. Rows lock automatically in both closed and open position . . . another great safety feature. For complete details, write for latest *Universal* catalog. Our engineers will be glad to give an estimate without cost or obligation to you. Don't delay. *Now* is the time to plan your gymnasium seating.





Universal Portable Wood Bleachers

Designed for ease and speed of erection; used effectively both indoors and out. Made of high grade, kiln dried Douglas Fir; bolted construction prevents splitting, assures greater safety. Special connectors eliminate overlapping of seat boards. Complete units are easy to move and store in minimum space. Table shows several group arrangements. Many others can be supplied.

TYPICAL SEATING PLANS			
Plan	Length	Rows	Capacity
1-W	75′0″	9	495
2-W	135′0″	10	990
3-W	210′0″	10	1540
4-W	180′0″	15	1980

Universal Portable Steel Grandstands

Built to hold more than four times the rated live weight load, yet easily erected and dismantled. Non-overlapping seat and foot boards are supported by well-braced vertical legs direct to ground. Conventional type illustrated above. Also available in elevated type, with walkway along front. For prompt action, select a plan from table at right. Other sizes also available.

TYPICAL SEATING PLANS			
Plan	Length	Rows	Capacity
1-S	90′0″	8	520
2-S	138′0″	10	1000
3-S	198′0″	10	1430
4-S	234′0″	12	2028

WAYNE IRON WORKS

Wayne Penna.

WAYNE

ROLLING GYMSTANDS



Wayne Standard Gymstand Model 50



Wayne Recessed and Special Gymstands Models 50-R, 50-S



Wayne Movable and Special Gymstands Models 50-M, 50-S

FUNCTIONALLY BEAUTIFUL . . . BEAUTIFULLY FUNCTIONAL

Wayne built gymnasium seating combines architectural attractiveness and sound engineering to blend beautifully into today's modern gymnasiums. When you buy Wayne, you buy all of Wayne's famous engineering advances:

SOUND CONSTRUCTION
- column base plates transmit live load to floor
- column feet provide complete stability
- diagonally braced for side sway

SMOOTH PERFORMANCE
- wheels travel independent parallel paths
- exclusive alignment frame assembly permits smooth, easy, straight opening and closing

SMART APPEARANCE
- completely vertical front when closed
- closed riser boards shield understructure from view

IMPROVED VISIBILITY FOR BALCONIES
- greater angle of clear view
- greater slope of sight line

COMPLETE SAFETY
- Wayne meets all and exceeds most grandstand safety tests and regulations

Types of Rolling Gymstands

1. **STANDARD—MODEL 50**—for use in a permanent location along a wall
2. **MOVABLE—MODEL 50-M**—for use in a temporary location
3. **RECESSED—MODEL 50-R**—for use in a recess or permanent location away from a wall
4. **SPECIAL—MODEL 50-S**—for balcony installations where special rise per row is required for visibility

For complete information request catalog k-54. Write direct to Wayne Iron Works, 544 N. Pembroke Avenue, Wayne, Pa.



WAYNE

OUTDOOR GRANDSTANDS

PERMANENT OR PORTABLE

VISIBILITY • COMFORT • SAFETY • ECONOMY

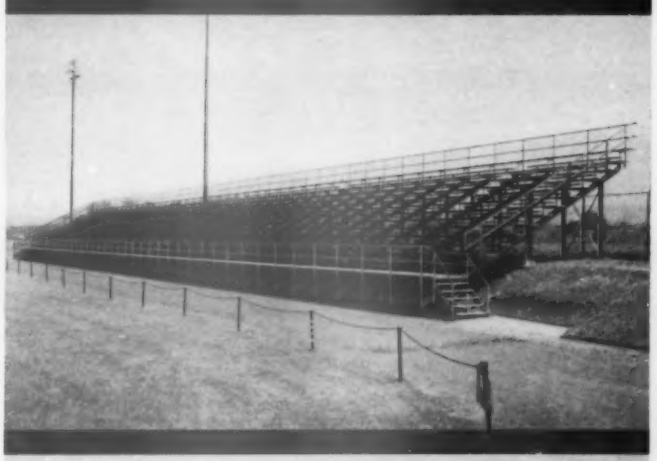
WAYNE'S FAMOUS PORTABLE TYPE "H"

A light-weight stand of solid construction, Type H affords the strength and durability of steel in a price range low enough to fit limited budgets. A six row 15′ section can be quickly and easily moved without dismantling. Type "H" is available in any number of rows from 2 to 25 and can be added to at any time.



PERMANENT OPEN DECK STEEL GRANDSTAND

Type "BC" Grandstand is designed to meet your complete requirements. It is built in any number of rows up to 50. Heavy duty steel supporting columns are set in concrete footings. Stringers are channel and angle iron construction with seat and footboards of seasoned, carefully selected and finished wood.



PERMANENT CLOSED DECK STEEL GRANDSTAND

Type "BP" is a steel deck grandstand built in any number of rows to meet your complete requirements. Risers and treads are of bent steel plate with H section steel columns anchored permanently to concrete footings. Locker rooms, concessions, rest rooms, etc., can be built under the stand.





For complete information request catalogs—

Portable — Catalog H

Permanent — Catalog P

Write direct to Wayne Iron Works, 544 N. Pembroke Avenue, Wayne, Pa.

Wayne Folding Partitions are illustrated and described in section B, pages 34, 35.

"Wayne Stands for Safety"

ALL-AMERICAN SCOREBOARD CORPORATION

271 Madison Avenue, New York, N. Y.

Before you buy a scoreboard,

YOU SHOULD KNOW THE SCORE!!

NOW you can get ALL the answers from a FREE new scoreboard handbook!

A new service of All-American, the leading manufacturer of scoreboards, this book (first of its kind) helps you plan and evaluate what each location needs.

You owe it to your school to know all the facts. Written for architects and school officials, this book is a concise, fully-illustrated and complete study of scoreboards.

- **What to look for in design**
- **Importance of visibility**
- **Scoreboard beauty in colors and shapes**
- **Degrees of accuracy in timing**
- **Remote control and why it must be simple**
- **Realistic maintenance explained in photos**
- **Installation methods that save money plus many other features**



Yankee Stadium
Cleveland Stadium
Madison Square Garden
Polo Grounds
Baltimore Stadium
Comiskey Park
Griffiths Stadium
Milwaukee Stadium

Just drop a note to us today for the free All-American scoreboard handbook,
"How To Score A Scoreboard!"

ALL-AMERICAN SCOREBOARD CORPORATION
Builders of the World's Largest Scoreboards

M. D. BROWN COMPANY

East Lake Street, Niles, Michigan

Scoremaster Football Scoreboard



MODEL 1250-2

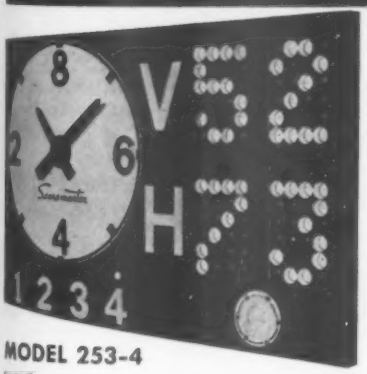
This marvel of modern design flashes time left for play, in minutes and seconds, by means of brilliant numbergrams. Timing mechanism is completely automatic, changing time by the second. The timer can be stopped instantly by the operator for time-out periods. It can be set to time any length period, also rapidly reset at any time. Upper left corner has red background; balance, green. Two brilliant football symbols show possession of the ball. The board is controlled by means of a compact, easy to operate control panel and multi-conductor cable, located at any convenient point in the stadium. All steel construction, baked enamel finish.

DIMENSIONS:

Board	8'4" by 18'4"
Numbergrams	12" x 18"
Football symbols	18" x 12"
Letters	12" high

Gigantic scoreboard for large stadiums also available.

Scoremaster Basketball Scoreboards



MODEL 253-4

Length	4'2"
Height	2'8"
Depth	6"
Shipping weight	90 lbs.
Clock dial diameter	25"

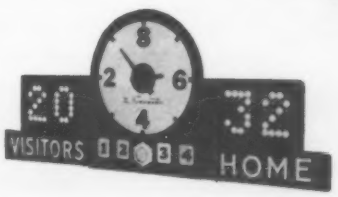
Horn sounds automatically at end of each period of play. The score indicators use 7½-watt colored lamps. Numbergrams are 10" x 6½".

Below—MODEL 250-1

This large streamlined and fully automatic board is the finest in scoring equipment.

Large enough for any gym
Modern in design
Accurate to the second

Length	7'8"
Height	3'1"
Depth	6"
Shipping weight	200 lbs.





MODEL 250-6

Has all the new features:

SYNCHRONIZED FLASHER-TIMER	LOUD HORN VIBRATOR TYPE
ELECTRIC NUMBERGRAMS	TRANSLUCENT TEAM NAMES
ALL UNITS ON SEPARATE CONNECTORS	REMOTE CONTROL

Overall size 72" x 34" x 6", numbergrams 6½" x 10", letters 5" high.

OTHER MODELS ALSO AVAILABLE

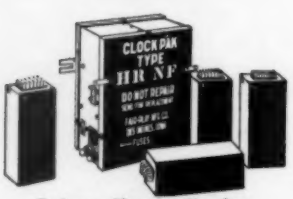
FAIR PLAY MFG. CO.

73 Thayer Street, Des Moines 15, Iowa

FAIR PLAY SCOREBOARDS



FF - 1S
America's Most Popular Scoreboard

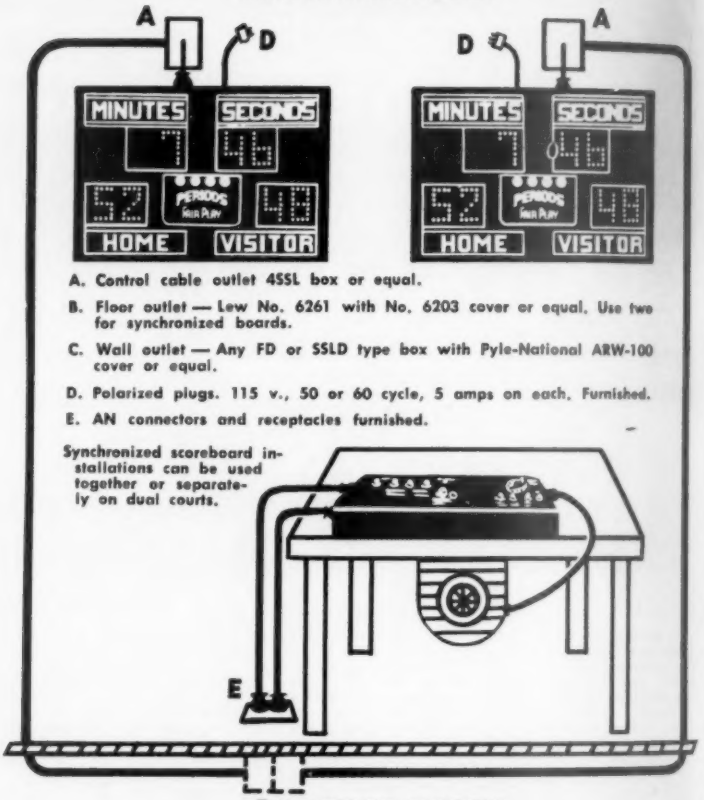


Relays Simply Unplug From Front of Board



Single piece control with Time-Out Clock

TWO SYNCHRONIZED



A. Control cable outlet 4SSL box or equal.

B. Floor outlet — Lew No. 6261 with No. 6203 cover or equal. Use two for synchronized boards.

C. Wall outlet — Any FD or SSLD type box with Pyle-National ARW-100 cover or equal.

D. Polarized plugs. 115 v., 50 or 60 cycle, 5 amps on each. Furnished.

E. AN connectors and receptacles furnished.

Synchronized scoreboard installations can be used together or separately on dual courts.

B B OTHER MODELS

FF-4S	Three or four sides	FB-50	Football scoreboard
FF-2S	Two sides	FB-50-B	Baseball scoreboard

SPECIFICATIONS

CABINET: Constructed of aluminum alloy 60" by 41" high by 6½" deep. Cabinet to be totally enclosed. Panels denoting MINUTES, SECONDS, HOME and VISITORS to be plastic, lighted from rear, painted black except for letters; to have brackets for hanging.

CLOCK: Time remaining to be played to be shown by four numeral blocks; each block to have 25 No. 51 six volt automotive lights with bayonet type base and form numerals 9" high on red lamicoid. Mechanism designed so that clock will read 00:00. After one second of operation a 20 minute clock will read 19:59 or a 10 minute clock will read 9:59 and time will automatically diminish by seconds. Either model clock may be quickly set from control for any minute of play within the limits of the movement. The impulse mechanism to be in desk control unit for ease of service. The clock pak including stepping relays to be housed in metal box in main cabinet. Clock pak to be removable by simply unplugging for ease of service and use in other type of scoreboard.

SCORE UNIT: Numeral blocks to be same as used in clock. Stepping relays for score units in main cabinet to be contained in cans which may be removed by simply unplugging. Each relay to be fused.

PERIOD: To be indicated by four lights behind lenses of varied colors with word PERIOD beneath.

CONTROL: Control to be single piece pressed metal long enough for two operators. Score and Quarter to have push button progressive control. Toggle switch for clock control and toggle switch for selective automatic horn. Control to have ten feet control cable with plug attached.

HORN: 110 volt vibratory horn to sound automatically at end of period or at will by push button. Horn to be at or near control.

FAIR PLAY MFG. CO. 73 Thayer Street DES MOINES 15, IOWA

NADEN & SONS ELECTRIC SCOREBOARD COMPANY

Webster City, Iowa

Naden ELECTRIC SCOREBOARDS

FOOTBALL
BASKETBALL
BASEBALL

Featuring "Instant-Vue" Numerals



Instant-Vue Football Scoreboard
Model N-400-IV

This newest Naden scoreboard instantly flashes the exact minutes and seconds left to play. The 24" Instant-Vue numerals are formed from electric bulls-eyes and are easily readable. Made from heavy gauge aluminum with edges turned for extra strength. The face is finished with black wrinkled enamel to eliminate glare; the back reinforced with aluminum angles.



Dial-Type Football Scoreboard Model N-400-D

This conventional dial type scoreboard is preferred by many officials. The eight-foot dial is quickly and easily read. The 12" numerals indicate minutes to play and the large red sweep-hand travels once around the dial each minute. Each graduation on the dial is one second. Long-lasting, pure white enamel is used on the dial and is baked on for durability.



Electric Basketball Scoreboard Model N-595

This basketball scoreboard embodies the latest developments to insure accuracy and dependability. Truly rounded numerals are used which are far easier to read at a glance than block or semi-block type numbers. Each individual light is covered with its own plastic bezel which gives better angle vision and makes it simpler to service individual bulbs.

The numerals are 12½" high for excellent visibility. Constructed of steel with baked-on wrinkle enamel finish. Large, resonating horn is included as standard equipment. Easily installed by school personnel.

WRITE FOR COMPLETE CATALOG

Football installations include delivery, erection and checking of the scoreboard by factory crews

CROUSE-HINDS COMPANY

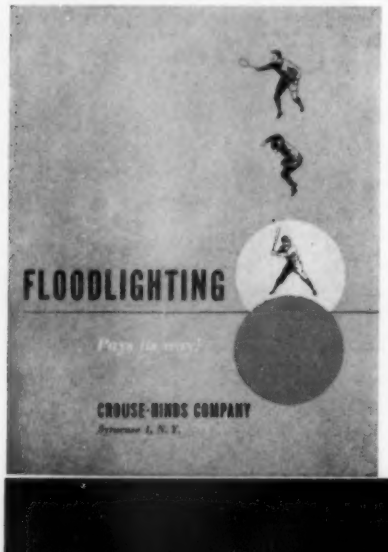
Syracuse, N. Y.

FLOODLIGHTING
Pays Its Way!



Players, spectators, and thrifty administrators cheer the FLA sportslight, designed by Crouse-Hinds lighting engineers to combine high efficiency, quality, and economy in athletic field lighting. Easy to install and maintain, the FLA sportslight is helping to attract bigger crowds wherever it is used.

Better play, longer practice time, increased school spirit, and community support are only a few of the benefits which are yours with Crouse-Hinds floodlighting. The entire job of planning your installation to the smallest detail is performed by our lighting engineers. You may send a map of your field or stadium, or write us and we will send a field engineer to your office for consultation. We will furnish a complete layout of your field or stadium. You are under no obligation to us, and you pay NOTHING for our services, while receiving the benefits of our extensive experience in sports lighting.





Send for our FREE illustrated booklet, "Floodlighting Pays Its Way!" for details on how your school can profit from Crouse-Hinds scientifically planned indoor and outdoor sports lighting, used in schools and universities throughout the country.



CROUSE-HINDS COMPANY
Syracuse 1, New York

Offices

Baton Rouge — Birmingham — Boston — Buffalo — Chicago
Cincinnati — Cleveland — Dallas — Denver — Detroit
Houston — Indianapolis — Kansas City — Los Angeles
Memphis — Milwaukee — New Orleans — New York
Philadelphia — Pittsburgh — Portland, Oregon — St. Louis — St. Paul — San Francisco — Seattle — Tulsa
Washington

Resident Representatives

Albany — Atlanta — Baltimore — Charlotte — Chattanooga — Corpus Christi — Reading, Pa. — Richmond, Va.
Shreveport

GENERAL ELECTRIC COMPANY

Apparatus Sales Division

1 River Road, Schenectady 5, N. Y.

Blue Stadium, Home of K.C. Athletics Modernizes with G-E Type L-69 Floodlights

Same L-69 floodlight offers economical lighting for schools of all sizes

When the Kansas City Athletics decided to modernize their Blue Stadium, they chose G-E floodlights for illumination. Even small schools can floodlight their sports fields economically with Type L-69 floodlights. Consider the case of the Plant High School.

Plant High School wanted to play games on the local school grounds instead of renting a field in another part of town. They believed that it would increase school spirit if the local community attended their sports events. Rent for the use of other stadiums required funds that would be available to them if their own field were lighted.

A floodlighting campaign was started to finance the new installation. The County School Board, the Plant High School Athletic Association, and the Plant High Dads Club all participated in gathering funds for the project. Public reaction was highly favorable.

The school and community are enthusiastic about the new floodlighting. They are able to play their games when they desire and to make their own schedules. Students can play on their home field when they want to, instead of trying to arrange for nights when other fields might be available. The Junior High School also formed a league. The field permits them to play at night with a greater interest in athletics. Gate receipts have also provided money for the teams to buy uniforms, hire coaches, and still pay floodlight operating costs. Juvenile delinquency has decreased, because the new facilities give the students a place to spend their free hours.



G-E floodlights illuminating sports field, Plant High School, Tampa, Florida



FREE PLANS AVAILABLE—To help you with the planning of your recreation area, here is a free manual of plans based on "NEMA-authorized engineering information." Not only lighting plans but lists of materials are included. There are plans for any sport from archery to volley ball—with special sections for football, baseball, and softball. Write for Bulletin GET-1284C. General Electric Company, Section 640-423, Schenectady 5, N. Y.

Reasons for Popularity of the L-69 Floodlight



- **1. Sturdy Construction**
- **2. Delivers More Light**
- **3. Easy Installation**
- **4. Simplified Maintenance**

For more information, write for Bulletin GEA-6067, *G-E Type L-69 Floodlights for Sports Lighting.*

Consult your phone book for the name of your nearest G-E Apparatus Sales Office or Distributor.

Progress Is Our Most Important Product

GENERAL ELECTRIC

OLIN MATHIESON CHEMICAL CORPORATION
INDUSTRIAL CHEMICALS DIVISION, Baltimore 3, Maryland

Atlanta 2, Ga., 225 Chester Ave., S.E.
Buffalo 3, N.Y., 1126 Rand Bldg.
Charlotte 2, N.C., Liberty Life Bldg.
Chicago 11, Ill., 400 N. Michigan Ave.
Cincinnati 2, Ohio, Dixie Terminal Bldg.
Houston 2, Tex., Gulf Bldg.
Los Angeles 22, Calif., 2535 Eastland Ave.
New Orleans 12, La., National Bank of Commerce Bldg.
New York 22, N.Y., 745 Fifth Avenue
Philadelphia 7, Pa., Lincoln-Liberty Bldg.
Providence 3, R.I., Hospital Trust Bldg.
St. Louis 2, Mo., Rialto Bldg.

PRODUCTS

HTH GRANULAR
HTH TABLETS
HTH TABLET HYPOCHLORINATOR
HTH BLEACH
HTH SODA BLEACH MIX
HTH-15 (Germicide)
Lo-Bax (Bactericide)
PH-Plus (Fused Alkali)

H T H GRANULAR



Positive sanitation is of prime and constant importance to schools and universities everywhere—particularly in connection with swimming pools, gymnasiums and locker rooms. For such a wide variety of sanitary requirements H T H Granular is a convenient and reliable source of chlorine. A dry, granular, free-flowing, readily-soluble product, H T H Granular contains 70% available chlorine and will retain that strength through long periods of storage. The convenient easy-to-handle 5-lb. cans of H T H Granular are packed nine to the case; also available in 100-lb. drums.

For Swimming Pools

For the continuous or periodic chlorination of swimming pool water, H T H Granular offers the advantages of dependability, simplicity and low first-cost of chlorinating equipment.

In addition to keeping the pool water safe, H T H Granular is recommended for use in a coordinated entrance-to-exit sanitation routine to keep locker rooms, footbaths, toilets, runways and other pool surroundings safe and sanitary. A valuable manual, "Keeping the Pool Safe and Sanitary," is available upon request, without cost or obligation.

H T H TABLETS AND THE H T H TABLET HYPOCHLORINATOR

H T H is also available in the convenient H T H Tablet form. H T H Tablets (with 70% available chlorine) dissolve slowly and provide a continuous source of available chlorine, over an extended period of time.

H T H Tablet Hypochlorination offers the ultimate in safety and convenience for accurately metering and feeding hypochlorite solutions. This equipment, specifically designed by Mathieson to dissolve H T H Tablets and to dispense the resultant hypochlorite solutions, provides a convenient and efficient method of feeding available chlorine at rates which can be accurately controlled and quickly varied to cover a wide range of operating demands. The H T H Tablet Hypochlorinator is of practical design, compact construction, and attractive appearance. It is easy to install and simple to operate. Moreover, H T H Tablet Hypochlorination eliminates all measuring and weighing operations, and requires no preparation of stock solutions. The H T H Hypochlorinator is engineered to give long-time reliable service. First cost is low, and since the unit operates with no moving parts, maintenance and upkeep requirements are almost negligible. H T H Tablets are available in 100-lb. drums and in 7½-lb. cans packed ½ dozen to the case.



OTHER MATHIESON PRODUCTS

AD-DRI BLEACH

A revolutionary new H T H product for the laundry industry, Ad-Dri Bleach is added dry to the laundry wheel on the second rinse for family, institutional and diaper service work, and on the third rinse for linen supply and industrial work—eliminating tanks, crocks, liquid bleach carboys and other troublesome features of preparing bleach solutions. Ad-Dri provides greater chlorine dispersion for controlled, uniform, accurate bleaching results, assuring you maximum whiteness retention with the lowest possible tensile strength loss. Dry, stable Ad-Dri Bleach is available in 100-lb. and 200-lb. drums.

H T H-15—An all-purpose germicide and deodorant which is ideal for use in school kitchens, dormitories, camps, etc. Containing 15% available chlorine, H T H-15 is also highly useful as a china dip for the removal of stains from dishes and chinaware.

Lo-Bax Special—A convenient chlorine carrier packed in handy bottles and containing 50% available chlorine. For preparing footbath solutions and for use around shower and locker rooms where small quantities of hypochlorite are required.

PH-PLUS—Restores the alkalinity which pool water may lose, especially when cylinder chlorine is used for disinfection—eliminates the acidity that makes eyes smart—makes purification more effective and residual chlorine less noticeable. Made in convenient, fused ½-lb. cakes, packed in 100-lb. burlap bags.

WALLACE & TIERNAN

Chlorine and Chemical Control Equipment

Belleville 9, New Jersey

REPRESENTED IN

Albany
Atlanta
Austin
Boston
Bridgeport
Buffalo
Charlotte
Chicago
Cleveland
Columbus
Dallas
Denver
Detroit
Havertown, Pa.
Houston
Indianapolis
Jacksonville
Jeffersontown
Kansas City
Knoxville
London
Lubbock
Minneapolis
Monrovia
Montreal
Oklahoma City
Pittsburgh
Portland
Roanoke
St. Louis
Salt Lake City
San Francisco
Seattle
Syracuse
Toronto
Union City
Washington
Winnipeg

WALLACE & TIERNAN INCORPORATED

Wallace & Tiernan is a completely integrated organization of specialists in chlorination and chemical feeding. For over 40 years this alert, progressive company has pioneered with such well-known developments as the visible vacuum principle in which chlorine is metered under a partial vacuum, the widespread commercial use of Break-Point Chlorination, and the first practical residual chlorine recorder.

In the field of swimming pool treatment, Wallace & Tiernan has a wide variety of time-tested Chlorinators, Hypochlorinators, and Chemical Feeders which can meet the requirements of all pools regardless of size. In addition, Wallace & Tiernan equipment is installed under the direct supervision of a member of the Wallace & Tiernan Service Organization which is conveniently located in the cities listed above.

W&T EQUIPMENT

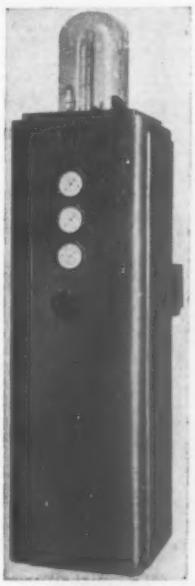


W&T Hypochlorinator Type HEMP

For Small Indoor Pools

W&T Hypochlorinators are particularly adapted to the needs of small pools. These rugged machines are easily installed. They take up only 4 square feet of floor space and require little attention. You just set the feed, turn on the power, and the system starts operating smoothly and efficiently.

These machines are available in the Electric and Belt Driven Types for Manual and Automatic Start and Stop Operation. Two other models using a Water Motor Drive are also available, one for Manual and the other for Automatic Proportional Control.



W&T Visible Vacuum Chlorinator Type A-418



W&T Chemical Reagent Feeder, Belt Drive, Type HBDM

For Large Outdoor Pools

W&T has direct feed, solution feed and visible vacuum feed chlorinators for every type pool. These rugged dependable machines are easy to maintain and require no skilled help to operate. Moreover, shut-down and start-up has been simplified to the point where it can be done easily and quickly—a decided advantage in intermittent pool operation.

Chemical Feeders

For the precise feeding of controlled amounts of such treatment chemicals as alum, soda ash, etc. W&T Chemical Feeders are compact, dependable machines, especially designed to do an economical, efficient job. They are available in four models, Electric, Belt Driven, Water Motor Drive Manual Control, and Water Motor Drive Automatic Control.

SERVICE

The W&T field service staff is always available to give prompt service on all W&T Equipment. This staff is prepared to suggest the proper chemical feed equipment for any swimming pool.

AMERICAN PLAYGROUND DEVICE COMPANY

WORLD'S LARGEST MANUFACTURERS OF FINE PARK, PICNIC, PLAYGROUND, SWIMMING POOL AND DRESSING ROOM EQUIPMENT

MAIN OFFICES AND PLANT, ANDERSON, INDIANA • BRANCH PLANT, NAHMA, MICHIGAN



For Superior Design, Construction and Performance, far greater Strength and Safety, Unequaled National Popularity

AMERICAN

Approved

PLAYGROUND EQUIPMENT

Finest heavy duty equipment built, backed by a *Lifetime Guarantee* against defective construction . . . courteous, highly personalized service on both your problems and your orders . . . prompt, friendly adjustments to your complete satisfaction . . . and low, nationally advertised prices which are still but little above pre-war 1941. American Approved Equipment has been specified by leading educational authorities for almost half a century.



Write Today

FOR ILLUSTRATED CATALOGS AND LITERATURE

AMERICAN
PLAYGROUND DEVICE CO.
ANDERSON, INDIANA, U. S. A.
WORLD'S LARGEST MANUFACTURERS OF FINE PARK, PICNIC, PLAYGROUND, SWIMMING POOL AND DRESSING ROOM EQUIPMENT

AMERICAN PLAYGROUND DEVICE COMPANY

designed by a champion for championship performance for a lifetime

American Approved Jim Patterson's LIFETIME aluminum diving board

world's finest official regulation board



SAFE Its aircraft design eliminates the torque (twisting action) at the tip of the board, giving an added safety factor not found in any other type diving board. The non-skid Safety Tread is full 18″ wide.

OFFICIAL Meets all requirements for A.A.U., N.C.A.A., F.I.N.A. Championships.

DURABLE It will give years of dependable service under constant use. Built to withstand rugged usage day after day, yet will provide maximum springing qualities.

BEAUTIFUL The graceful lines and glistening aluminum color of the Lifetime board will enhance the beauty of your pool.

ECONOMICAL Eliminates the broken diving board problem, increases patronage. Will pay for itself within just a few seasons.

LIGHT WEIGHT Weighs less than conventional wood or coated-wood diving board, is easier to install or remove for storage.

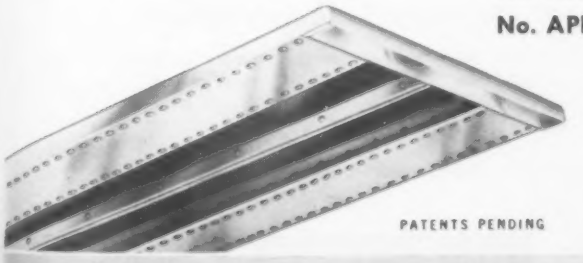
SCIENTIFICALLY DESIGNED Designed to withstand many times the actual load requirements. Its spring-leaf design gives added strength in the fulcrum area where it is most needed, and lightness at the tip.

Only American Approved Jim Patterson LIFETIME Aluminum Diving Boards Offer You These Highly Important Plus-Features

Exhaustive tests at scores of installations prove that only the new American Approved Jim Patterson LIFETIME Aluminum Diving Board will withstand extremely severe use, day after day, yet continue to deliver unmatched performance, year after year, free from repair or replacement cost. Only the Jim Patterson Lifetime Aluminum Board fits any regulation diving standard, is so easily installed or operates so noiselessly. Effortless take-offs, uniform flexibility throughout the entire board, with no torque, twisting action or distortion at the tip. Protected fully against salt water or corrosion. American's Battleship Safety-Tread, full 18″ wide, provides the safest, most attractive and most comfortable non-slip covering known. Unequaled in design or construction by any other aluminum or fiberglas-coated wood board, here is the world's finest Official Regulation Board!

No. APL-14 LIFETIME Aluminum Board, 14′ long, 130 lbs. . $325.00

No. APL-16 LIFETIME Aluminum Board, 16′ long, 140 lbs. . $325.00



PATENTS PENDING

exclusive international distributors

AMERICAN
PLAYGROUND DEVICE CO.
ANDERSON, INDIANA, U.S.A.
WORLD'S LARGEST MANUFACTURERS OF FINE PARK, PICNIC, PLAYGROUND, SWIMMING POOL AND DRESSING ROOM EQUIPMENT

☆ ACCLAIMED BY CHAMPIONS

"I like the feeling of firmness under my feet, and the lightness at the tip. You get so much more height without effort. This is really a dream board . . . the very finest I have ever dived on."

BRUCE HARLAN, 1948 Olympic Diving Champion.

GENERAL PLAYGROUND EQUIPMENT INC.

Kokomo, Indiana

FUN-FUL

PLAYGROUND AND SWIMMING POOL EQUIPMENT



Basket Ball Backstop

Playground Equipment

SWINGS
SEESAWS
SLIDES
CLIMBING STRUCTURES
MERRY-GO-ROUNDS
GYMNASIUM EQUIPMENT
BICYCLE RACKS
POWER MOWERS

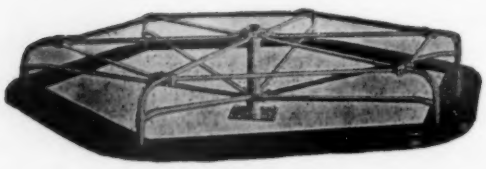
Swimming Pool Equipment

LADDERS
DIVING TOWERS
DIVING STANDS
DIVING BOARDS
WATER SLIDES
LIFE GUARD CHAIRS
POOL CLEANING EQUIPMENT

The HILL-STANDARD LINE

OUR PLAYGROUND AND SWIMMING POOL APPARATUS HAS BEEN USED BY THE MAJORITY OF THE LEADING PARKS, RECREATIONAL CENTERS, ATHLETIC CLUBS AND Y. M. C. A.'s FOR MANY YEARS. YOU WILL FIND DESCRIBED IN OUR CATALOG THE LARGEST LINE OF PLAYGROUND AND SWIMMING POOL EQUIPMENT MANUFACTURED BY ONE COMPANY

WRITE FOR CATALOG NOW!



Merry-Go-Rounds



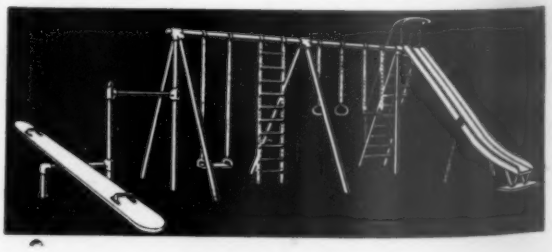
ONE METER DIVING STAND

OLYMPIC FIBERGLAS DIVING BOARDS

Our super quality boards are made from the finest Douglas Fir available. They are then covered with layers of fiberglas cloth impregnated with plastic resin. Boards have special non-skid surface to prevent slipping. Our FIBERGLAS boards give the extra spring that makes the difficult dives easy.



Slides



School Combination No. 670

PORTA·PLAY

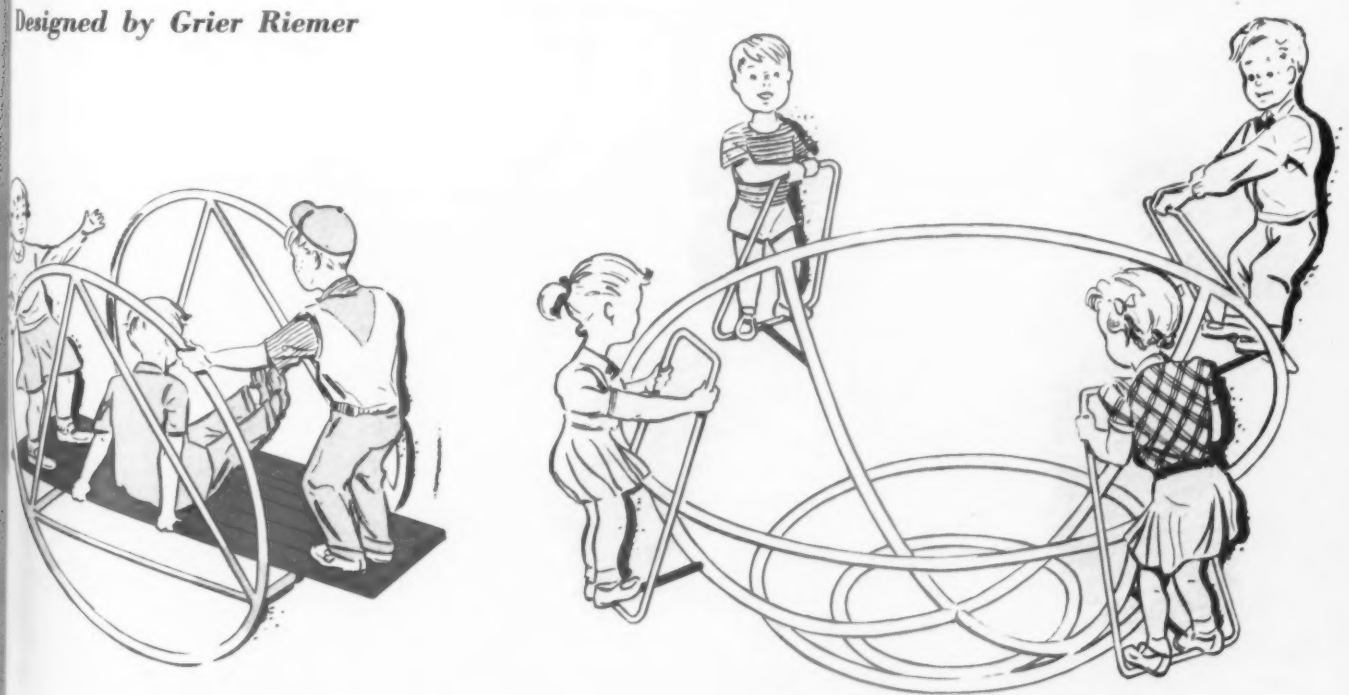
imaginative modern playground equipment expressed in new and challenging forms...

These contemporary play devices might well be inspired by the zoom of a rocket takeoff, or the magic of an underseas journey; so completely do they enter the imaginary play world of our modern children. Yet their design, supervised by experienced school architects, is sound and fundamental, promoting basic physical development, providing ample space for group play, and maintaining a practical lightness and portability so desirable in the progress of our expanding school systems.

The possibilities of Porta-Play equipment in planning new school recreational areas, and in rehabilitating old playgrounds, are unlimited. Schools now under construction, or in the planning stages are incorporating new architectural forms in exterior design that spell progress and forward thinking. This same atmosphere can be established in the play areas, through the use of Porta-Play units. They represent the most advanced designing in the playground equipment field.

ROCKA • ROUND
4 WAY
TEETER-TOTTER

Designed by Grier Riemer



ROCKA • BOARD
new, multiple action teeter
for climbing, rocking, gymnastics

Distributed Nationally by

DESCO CORPORATION
SHAKER SQUARE, CLEVELAND 20, OHIO



Portable Basketball Bankboard

Sturdy modern design, withstands rugged play yet light enough to move around the playground. Ideal for limited space playgrounds. Complies with all scholastic regulations.

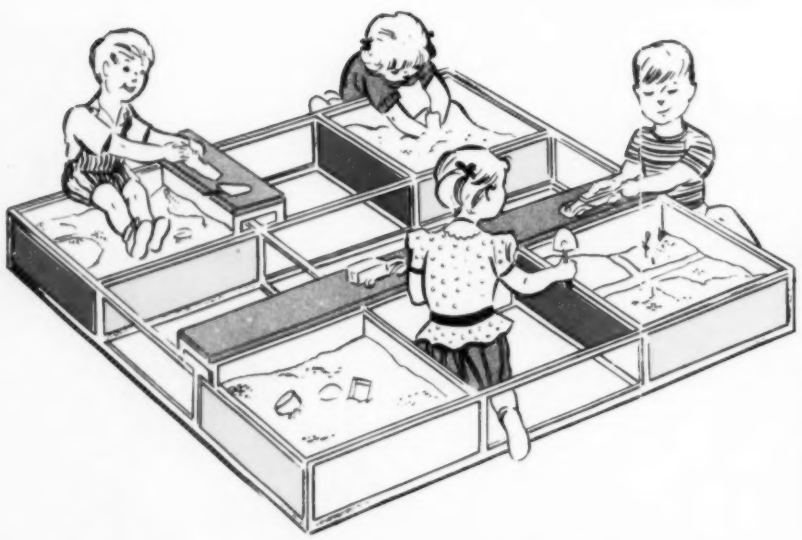


Gang Slide

Today's children have missed the thrill of the old slanting cellar door. We've brought it back in modern dress. This stainless steel slide is wide enough for full length roll downs or group action. Maximum height of slide top is four feet from ground.

a completely new approach to organized play

imaginative • challenging • lightweight • rustproof



Play Box

Four boxes for sand, shelves for wheel toys, and a standing invitation to build or bake with magic sand. 12 play spaces for preschool homemakers and engineers.



Play House

It's a house, a space ship, a theater, an office or a thousand other projects for young America. Aluminum tubing with gay plywood platforms give it a carnival spirit. It can never rust . . . requires little maintenance . . . and can be moved to shady areas on hot days. A good base of operations for the play supervisor in launching group activities.

COLORS

Red, Yellow, Green, Blue, Aluminum (Silver), Black & Natural Wood.

ASSOCIATED with DICKEY INDUSTRIES

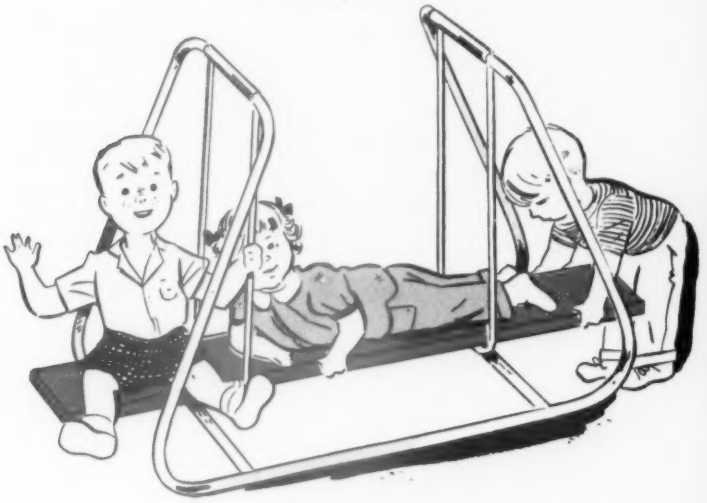


Climba • pole

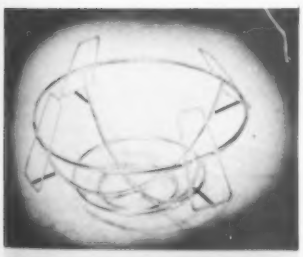
Training for future supermen and firemen. A wonderful ten foot climbing and sliding pole that develops young muscles and perfects coordination.

Floata • board

The old lawn swing inspires a new play swing for the beginners. With a little suggesting, it becomes a train or a space ship, or a new atomic submarine. Encourages group action. All aluminum with wood board. Easily moved.

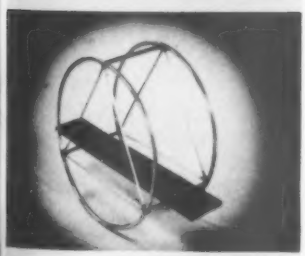


SPECIFICATIONS



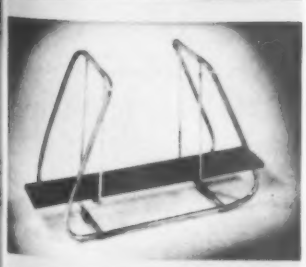
ROCKA • ROUND

Available in Primary, Elementary and Junior sizes. Sturdy, welded, aircraft aluminum tubing, indestructible.



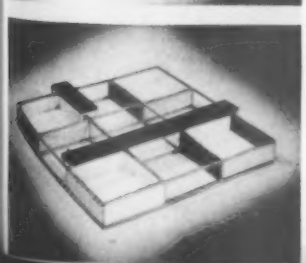
ROCKA • BOARD

Available in Primary, Elementary and Junior sizes. Sturdy, welded aircraft aluminum tubing, indestructible. Board #1 white fir, painted 3 coats.



FLOATA • BOARD

Available in Primary and Elementary sizes. Sturdy, welded aircraft aluminum tubing, indestructible. Board #1 white fir, painted 3 coats.



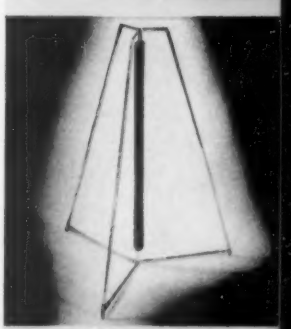
PLAY BOX

12″ high, 9′ overall, 4 containers, 3′ sq., work surfaces 12″ x 3′ and 12″ x 9′ sq. Aluminum tubing for frame, welded, wood same as others, boxes, marine plywood, painted.



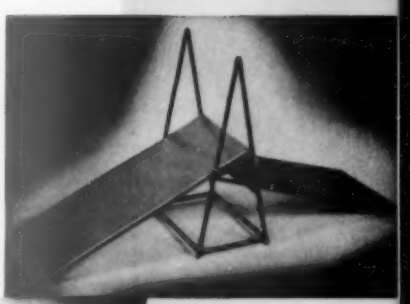
BASKETBALL BANKBOARD

Regulation for scholastic standards, aluminum tubing square and extruded, vertical panel aluminum mesh. Base wood as others, bankboard perforated and light.



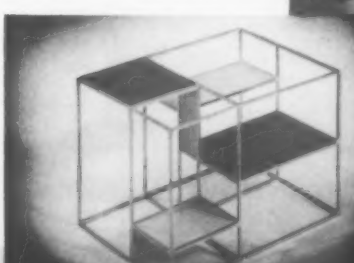
CLIMBA • POLE

Sturdy aircraft aluminum tubing, wood pole of 3¼″ poplar, 10′ high. Climb-up and slide-down action.



GANG SLIDE

Wood plank approach ramp 8′ long; slide of stainless steel 8′ wide, 9′ long, 4′ high, aluminum side supports 8′ high. No sharp edges, planks #1 white fir, stained and treated.

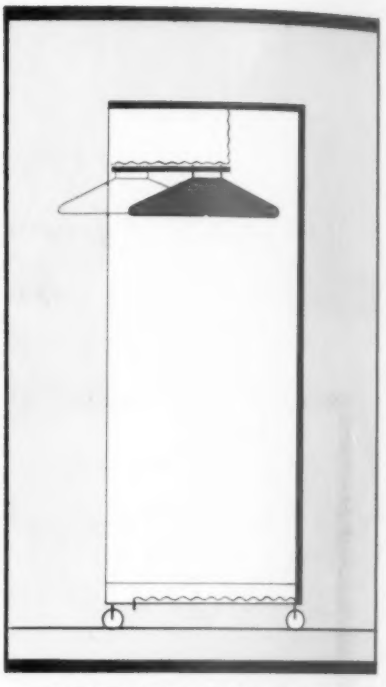


PLAY HOUSE

Materials same as PLAY BOX. 4 Plywood play levels in primary colors, sturdy welded frame. 5′ wide, 9′ long, 5′ high.

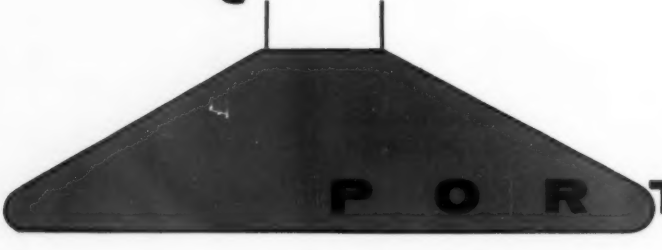
A *new and long-needed portable classroom storage unit...*





SPECIFICATIONS

Patented sliding hanger which pulls out for easy coat removal. Sturdy, permanently attached hangers. Aluminum mesh shelves for hats and footwear dry moisture faster. Best quality plywood panels. Heavy-duty double-wheeled casters. Fifteen to eighteen hangers, depending on size of units.



PORTA-ROBE

... brings to new school design and old school modernizing the advantages of portable garment storage, material storage, and additional bulletin and display space.

There are sizes for primary and elementary grades. The patented hangers are permanent and trouble-free. Aluminum storage shelves resist conditions caused by rain, snow and mud. Porta-Robes make excellent room dividers for large classrooms. They form a modular storage system that can keep pace with rising school registrations and classroom rearrangements. Make Porta-Robe a vital part of your school planning.

	BASIC UNIT	BASIC UNIT WITH STORAGE COMPARTMENT	BASIC UNIT WITH TACK BOARD	BASIC UNIT WITH STORAGE & TACK BOARD	BASIC UNIT WITH CHALK BOARD	BASIC UNIT WITH STORAGE & CHALK BOARD
5P SERIES	5P 66" W—18" D—50" H	5PS 84" W—18" D—50" H	5PT	5PST	5PC	5PSC
6P SERIES	6P 78" W—18" D—50" H	6PS 96" W—18" D—50" H	6PT	6PST	6PC	6PSC
5E SERIES	5E 66" W—20" D—56" and 60" H	5ES 84" W—20" D—56" and 60" H	5ET	5EST	5EC	5ESC
6E SERIES	6E 78" W—20" D—56" and 60" H	6ES 96" W—20" D—56" and 60" H	6ET	6EST	6EC	6ESC

Associated with Dickey Industries
Distributed Nationally by: **DESCO CORPORATION • SHAKER SQUARE • CLEVELAND 20, OHIO**

RECREATION EQUIPMENT CORPORATION

Dept. AS-55 • Anderson, Indiana

Solve your playground, pool, and gym equipment needs with

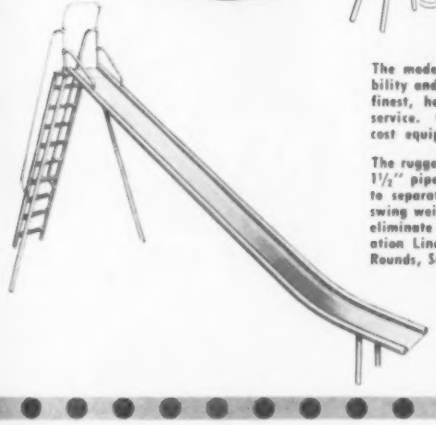
THE RECREATION LINE



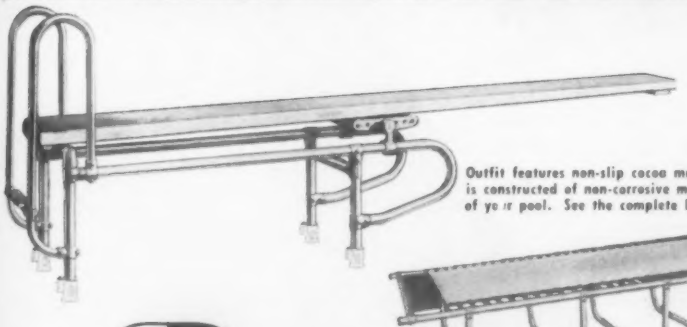


The modern Recreation Line stresses two engineering features—durability and built-in safety. All Recreation Equipment is made from the finest, heavy-duty materials, and offers years of safe, trouble-free service. Contact our engineering department for the safe and low-cost equipment installation specifically suited to your requirements.

The rugged Six Seat Swing Set features weather-proof 2" top rails and 1½" pipe uprights with oilless bearings, a short span frame designed to separate swings and to hold more than ten times maximum safe swing weights. As an added feature, Recreation's new Swing Belt Seats eliminate swing injuries and dangerous falls. See the complete Recreation Line of durable and safe playground equipment Merry-Go-Rounds, See Saws and Monkey Gyms.



Of rugged construction—with sturdy pipe supports and ladders, high guard rails, and securely riveted chutes—Recreation Slides insure years of safe and dependable service. Available in all lengths—shapes.



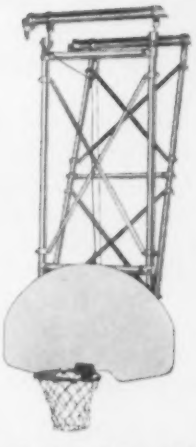
Engineered to meet N.C.A.A. and A.A.U. specifications — Recreation's latest One Meter Diving Board Outfit. Designed for narrow walkways, this Outfit features non-slip cocoa matting tread for safety and is constructed of non-corrosive materials. Built for the life of your pool. See the complete line of Pool Equipment.





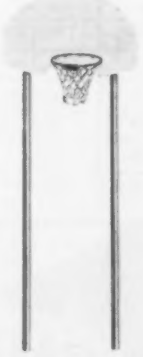
Life Lines by Recreation Equipment are made from top grade three-quarter inch water-proofed Manila rope or Saran Plastic. Available with plastic floats, flush embedded wall anchors and clevis pin for attachment.

Rufus, Recreation's Guardian Angel, is safely practicing his tumbling exercises on the Recreation Bouncer. Perfect for any athletic practice requiring form and timing. The adjustable frame of Bouncer compensates for canvas stretch. Offers shockproof spiral spring.



Choose from Recreation's complete line of Indoor and Outdoor Basketball Backboards. The Swing-Up Backboard shown comes in fan-shaped or rectangular metal, plywood or glass banks. All are extended 6" from supporting pipes for full visibility.

Below: Recreation's low-cost Outdoor Fan-shaped Metal Basketball Outfit. Constructed from corrosion-resistant metals.





WRITE TODAY FOR YOUR NEW '55 RECREATION CATALOG

● PLAYGROUND EQUIPMENT ● SWIMMING EQUIPMENT ● BASKETBALL EQUIPMENT

THE RECREATION LINE

RECREATION EQUIPMENT CORPORATION

DEPT AS-55 • ANDERSON, INDIANA

UNITED METAL CABINET CORPORATION

186 Seventh Street, Brooklyn 15, N.Y.

West Coast Distributor: Shoreline Metals, Los Angeles, California

SWING TOP WASTE RECEPTACLE





Delivers

Longer Lasting Service
Better Sanitary Efficiency
More for your money

- Electrically welded throughout of heavy gauge furniture steel.
- Two independently-operating scientifically counter-balanced silent doors. No springs to go out of order.
- Tops gabled for strength. Mounted on two concealed hinges which hold top open when swung back. No interfering chains.
- Inner container easily removable.
- Bonderized. Heavy enamel finish baked on at high temperature.
- Colors: Olive Green, Hammertone Green, Gray, White. Inner containers furnished.

Stainless Steel Legs

Catalog Number	Size of Base Inches	Body Height Inches	Overall Height Inches	Shipping Wgt. Lbs.	Inner Container Furnished as Standard
*110	11½x11½	18	24¾	20	12 Paper bags
112	11½x11½	28	34½	32	1 metal can
‡115	11½x11½	35	41¾	36	1 metal can
*130	16x16	27	35½	39	1 Burlap bag
*150	21x21	35	46	74	1 Burlap bag
*†150W	21x21	35	46	74	1 Burlap bag

* Available with galvanized inner containers.
† For outdoor use—special weather resisting finish.
‡ Also available with burlap bag.

UNITED

SANITARY NAPKIN DISPOSAL RECEPTACLE



wire
gym baskets
and racks

chair and
table trucks

kindergarten
nesting cots

chart and
chalkboard
racks



typical installations

school	dealer
Anchorage City School, Anchorage, Alaska	J. K. Gill Co., Portland, Oregon
Arizona State College, Flagstaff, Arizona	P.B.S.W. Supply and Equipment Co., Phoenix, Ariz.
Phoenix Public School, Phoenix, Arizona	P.B.S.W. Supply and Equipment Co., Phoenix, Ariz.
Columbia High School, Columbia, Tenn.	Tennessee Equipt. & Supply Co., Nashville, Tenn.
Englewood Public School, Englewood, Colo.	Am. School Supply Co., Denver, Colo.
Del Norte High School, Crescent City, Calif.	J. K. Gill Co., Portland, Oregon
Rigby Public School, Rigby, Idaho	Caxton Printers, Caldwell, Idaho
Iowa State Teachers College, Cedar Falls, Iowa	J. S. Latta and Sons, Cedar Falls, Iowa
Jamestown Park Board, Jamestown, S. D.	Colburn School Supply Co., Grand Forks, N. D.
Ludington City Schools, Ludington, Mich.	Standard School Co., St. Louis, Mich.
Stamps High School, Stamps, Ark.	All-State Supply Corp., Little Rock, Ark.
Olympia High School, Olympia, Wash.	Lowman Hanford Co., Seattle, Wash.
Dodge City School, Dodge City, Kan.	Thacher, Inc., Topeka, Kansas
Norwalk City School, Norwalk, Ohio	Miller Office Supply Co., Piqua, Ohio
Waymart City School, Waymart, Penn.	American Seating Co. of Pa., Philadelphia, Penn.
Tracy Public School, Tracy, Minn.	Midwest-Beach Co., Sioux Falls, S. D.
Bedford City School, Bedford, Indiana	Allied, Inc., Indianapolis, Ind.
Carbondale School, Carbondale, Ill.	Blackwell, Wielandy, St. Louis, Mo.
Murray City School, Murray, Kentucky	Chas. H. Bunch Co., Louisville, Ky.
Huntington Long Island School, Long Island, N. Y.	Bacon and Vincent Co., Inc., Buffalo, N. Y.
Warrenton Colored High School, Warrenton, Va.	J. H. Pence, Roanoke, Va.
McCoach Recreation Center, Philadelphia, Pa.	City of Philadelphia Procurement Dept.
Stranahan High School, Fort Lauderdale, Fla.	McCan Freeman Co., Fort Lauderdale, Fla.

G-4/Pa

PACIFIC SHAW COMPANY

BOX 870 • PORTLAND 7, OREGON

PACIFIC SHAW GYM BASKETS

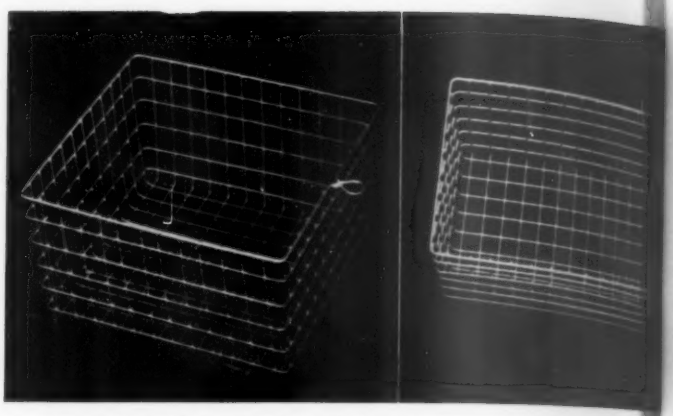
Pacific Shaw wire baskets for storage of gym clothing help keep locker rooms sanitary and discourage unpleasant odors. Open construction permits passage of air at all times. Baskets require less than one cubic foot of space per student, are easily steam cleaned, and release lockers to serve several classes per day for dress usage only.

Construction features

Bottom and sides of 12-ga. wire; all cross wires spot welded; heavy 6-ga. one-piece top rim securely welded in place. Padlock hasp punch-pressed in front side and extended 1½ in. beyond top rim. Intermediate rims equally spaced and welded into position to lock rigidity into basket and provide strength to withstand rough usage. Full bottom permits shoes to lie freely in basket. Zinc-cadmium plated after fabrication.

Sizes

Type	Dimensions, in. H x D x W	Model	Mesh	Weight, lb.
Large	7¾ x 13 x 12	G1	¾-in. ½-in.	3 4
Small	7¾ x 13 x 9	G2	¾-in. ½-in.	2¾ 3½



Large basket (G1), left; small basket (G2), right.

BASKET RACKS

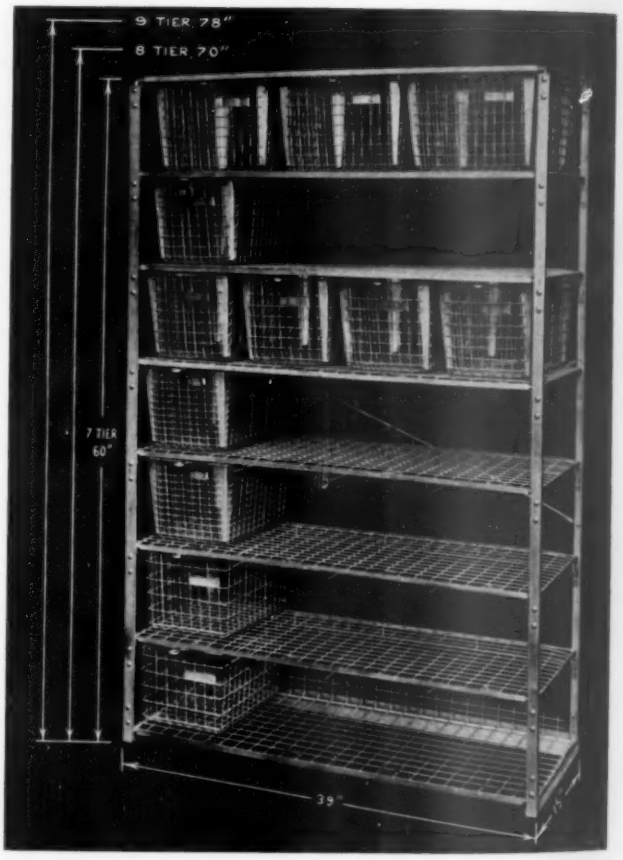
Pacific Shaw Gym Basket Racks are designed for maximum ventilation, to allow air circulation (forced or free) in any direction. Up to 36 baskets per rack, neatly stored in minimum space. Any rack can be made into a basket truck by adding four rubber, ball-bearing casters (2-in. casters recommended for smooth floors, 3-in. for rough floors). Double trucks can also be formed by bolting two racks back to back.

Construction features

Shelving frame of cold rolled 5.16-in. steel rod; shelf grid of 12- and 10-ga. steel wires cross welded and extended over and down in back to make a rigid brace as well as a basket stop. Rack shelves electro-plated zinc, guaranteed rustproof, permanent finish. Basket dividers not needed as baskets spring into place with no hand room between them and shelf grid when in their recessed permanent position. Basket guides of 6-ga. wire are used below shelving to ease basket into numbered position. Uprights of cold rolled channel, matching appearance of racks and baskets. Each rack furnished with a welded X frame for the back; brace rods not needed for sides.

Sizes

Type	Model	No. of tiers	Dimensions, in. H x D x W	Capacity
for grade schools	R21 R28	7	60 x 15 x 39	21 G1 baskets (3 wide) 28 G2 baskets (4 wide)
for junior high schools	R24 R32	8	70 x 15 x 39	24 G1 baskets (3 wide) 32 G2 baskets (4 wide)
for senior high schools and colleges	R27 R36	9	79 x 15 x 39	27 G1 baskets (3 wide) 36 G2 baskets (4 wide)

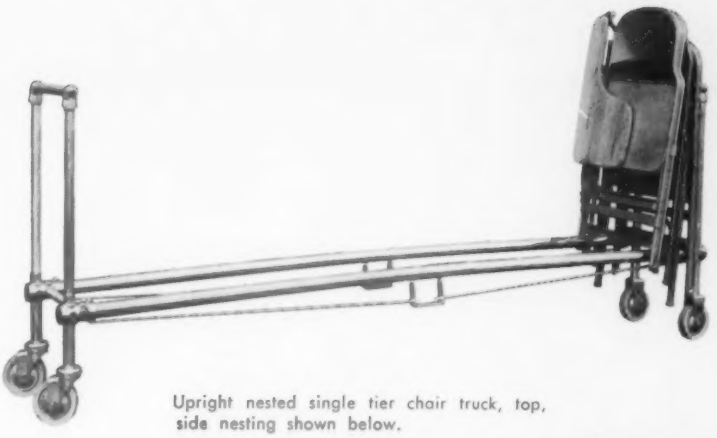


Wire basket rack showing arrangement of three large, or four small, baskets per shelf.

Assembly

Each rack shelf has four projections, coined, punched and held in place on channel uprights with eight aluminum rivets. All racks are shipped knock-down in steel-strapped cardboard containers, including uprights, rivets and installation instructions. Approximate set-up time is estimated at 1 minute per student accommodated.

PACIFIC SHAW CHAIR and TABLE TRUCKS



Upright nested single tier chair truck, top, side nesting shown below.

Pacific Shaw Chair and Table Trucks are specifically designed for mobility, time saving and efficient storage. Folded chairs or tables can be stacked on the truck upright or side nested for under-stage storage. Fingertip control simplifies transportation.

Trucks are adjustable to all folding chairs and tables, regardless of dimensions; all makes and sizes can be safely and easily carried at the same time.

The tubular frame of the truck does not mar finish of chairs and tables; it is made of high strength airplane type lightweight aluminum alloy with natural finish.

The large diameter casters were designed for Pacific Shaw by the world's largest manufacturer of casters. They are cushion-type, of natural grey rubber, non-marring on floors with polished surfaces.

Trucks can also be used for general tote and transfer duty, in auditorium, gym, cafeteria, recreational and other school centers. Each unit, compact and lightweight, is individually packaged for easy handling. Instructions for assembly are enclosed.





Double tier chair truck.

Construction features

Frame: direct weight-carrying members of 1¼-in. ID heavy wall 61S-T6 aluminum tubing. Upright and cross members (adjustable) of ¾-in. ID heavy wall 61S-T6 aluminum tubing. Shelby steel tubing reinforcement extending up 8 in. from caster bearing; on multiple units this steel collar extends to upper level of chairs. All friction binding castings (adjustable) have high PSI tensile strength as cast, a 100% safety factor when loaded. Natural aluminum finish. All trucks of same construction type except as to length. T-5 table trucks adjustable up to 18 in. wide; T-7 (one end open) adjustable up to 30 in. wide.

Sizes

Type	Stacking method	Model†	Units carried	Factory load recommendations	Recommended wheel	Shipping weight, lb.
Chair trucks	upright nesting*	PS-4	22	500	3" black Baco	25
		PS-5	27			27.5
	understage side nesting	PS-6	33	800	4" white Darnell[1]	30
		PS-7	39			32.5
	upright nesting*	PS-8	46	1200	5" white Darnell[2]	45
		PS-9	52			52
		PS-10	58			58
	upright nesting* double wide double tier	DHW-4	88	2400	6-5" white Darnell[3]	100
		DHW-5	108			110
		DHW-6	132			125
Table trucks	side nesting	T-5	8	800	4" white Darnell	30
	flat nesting	T-7	20	1200	5" white Darnell	40

* Chair stops that automatically hold chairs in upright position are included.
† Model number denotes length of truck in feet.
[1] Three inch wheels can be used to gain clearance or lessen cost.
[2] A smaller wheel can be used when this model is used for under-stage, side nesting; and a minimum of clearance at 26 inches.
[3] For a door clearance of less than 80" use three inch all swivel wheel.

PACIFIC SHAW KINDERGARTEN NESTING COTS

Pacific Shaw Nesting Cots are sturdy, practical, and attractively designed in a wide range of colors to brighten the nursery school or kindergarten. They are easily stacked so as to be out of the way when not in use. The canvas covers are both removable and washable, and withstand the hard wear inevitable with small children.

Construction features

Aluminum side rails of 61-S-T6 heavy wall one-in. tubing; cross rails of ⅝-in. heavy wall tube. Head end is two stage drilled; cross rails slip through one wall and are threaded on ID with ½-in. thread to form a rigid lock against outer wall. Canvas covers of heavy army duck, Vivatex finish, water and mildew repellent, sanforized; all seams double-sewn with lock-stitch; foot end has slip fittings for easy removal of covers. Both models factory pack 6 per carton, shipped KD & FF.

Sizes

Type	Dimensions, in. Canvas W x L	Dimensions, in. Overall L x H	Model	Weight, lb.
Nursery and pre-school	24 x 48	61 x 10	2448K	6
Day nursery and kindergarten	24 x 60	73 x 10	2460G	8



Kindergarten nesting cots.

CHART and CHALKBOARD RACKS

These frames are suitable for chart, chalkboard, plywood, tackboard, cork or other surfaces. Chalkboard frames are made up of ganged chart racks and put on casters for mobility, chalk trough included.

Construction features

Side rails and floor standards of 61S-T6 one-in. heavy wall tubing; cross rails of ⅝-in. tubing. Uprights are two stage drilled; cross rails slip through one wall and are threaded on ID with ½-in. thread to form a rigid lock against outer wall. Uprights and floor standards are joined by tee fittings, demountable. Surface to be furnished by school or others.

Sizes

Model 6030 Standard is 60 in. high x 30 in. wide. Factory pack one or two per carton, shipped KD & FF.



Chart or chalkboard rack.

PACIFIC SHAW COMPANY

BOX 870 • PORTLAND 7, OREGON

Pacific Shaw products are distributed through the members of the National School Service Institute

G-5/Be

BENNETT



DROP-IN WASTE RECEPTACLE

SELF-CLOSING WASTE RECEPTACLE

Make Cleanliness Automatic



- ★ SANITARY
- ★ EASY TO USE
- ★ EASY TO EMPTY
- ★ TIME SAVING
- ★ BUILT TO TAKE HARD EVERYDAY USE



Bennett Drop-in Waste Receptacles are designed with no moving parts, nothing to touch,—just drop in paper towels, cups and other waste in top. White baked on enamel finish with wrap around stainless steel base provides a harmonious combination of beauty. Rubber gasket around top opening finishes off smart appearance. Extra heavy-duty steel is chemically processed primed for corrosion resistance — ideal for outdoor as well as indoor use. Complete with full-size, water-tight galvanized liner equipped with convenient, full swing handle for fast emptying. Model 35 Bennett Drop-in Waste Receptacle is 15" in diameter, 35" high and approximate shipping weight is 34 lbs. Write for Bulletin 854 for complete information.

Bennett Self-closing Waste Receptacles are equipped with stainless steel feet to eliminate corrosion and rust marks. Positive closing doors repel insects, rodents and reduce fire hazards. Extra heavy gauge steel, all welded construction, reinforced rounded corners provide sturdiness to withstand continuous, hard everyday use. These are a few of the many features that make Bennett Self-closing Waste Receptacles a natural "buy". Finished in green, gray or white baked on enamel. Chemically processed primed steel for corrosion resistance makes these receptacles ideal for outdoor as well as indoor use. Available with Osnaberg Bags or watertight, rust-proof and sanitary galvanized liners.

See Complete Line on Other Side

THE BENNETT MANUFACTURING COMPANY

ALDEN, NEW YORK

BENNETT

SELF-CLOSING WASTE RECEPTACLES
with Stainless Steel Feet

Everybody is automatically a member of your cleaning department by conveniently placing Bennett Self-closing Waste Receptacles to invite their use wherever people congregate. Self-closing door mechanism keeps the 2 doors closed when not in use and permits easy opening with finger tip pressure. Door mechanism is protected against exterior climatic conditions. Rubber bumpers assure quiet closing of both doors.

Solid, reinforced bottom assures life-long rigidity of entire receptacle body. Rounded corners are reinforced for strength and pleasing appearance — nothing to catch and tear clothes. Wide range of sizes in green, gray or white finish provide a model for every purpose — another reason to standardize on Bennett Bilt Waste Receptacles. Write for Catalog 254 for complete information.

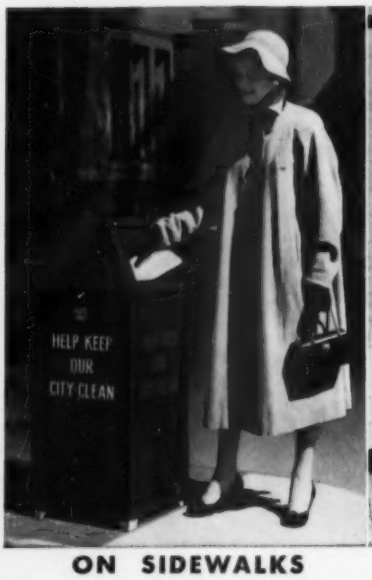


TABLE OF SPECIFICATIONS

Catalog Number	Size of Base	Body Height	Overall Height	Approx. Shipping Weight	Inner Containers Furnished As Standard
19-L	9" x 9"	4"	10"	7 lbs.	Galv. Inner Can With 25 Waxed Paper Bags
112-L	11½" x 11½"	27½"	34½"	28½ lbs.	1 Galv. Inner Can
125	11½" x 11½"	19"	26"	19 lbs.	25 Waxed Paper Bags
125-L	11½" x 11½"	19"	26"	27 lbs.	1 Galv. Inner Can
142	11½" x 11½"	34"	41"	26 lbs.	1 Heavy Osnaburg Bag
142-L	11½" x 11½"	34"	41"	33 lbs.	1 Galv. Inner Can
130	16" x 16"	26"	36"	33 lbs.	1 Heavy Osnaburg Bag
130-L	16" x 16"	26"	36"	43 lbs.	1 Galv. Inner Can
140 (Heavy)	16" x 16"	31"	41"	40½ lbs.	1 Heavy Osnaburg Bag
140-L (Heavy)	16" x 16"	31"	41"	52½ lbs.	1 Galv. Inner Can
148 (Heavy)	22" x 22"	37"	49"	77½ lbs.	1 Heavy Osnaburg Bag
148-L (Heavy)	22" x 22"	37"	49"	100 lbs.	1 Galv. Inner Can

Standard Colors: Green, Gray or White

NOTE: Model numbers with L are supplied with Galvanized Liners instead of bags. Models 140 and 148 are ideal for outdoor use. Specially designed, light weight shipping cartons protect receptacle and reduce freight costs. Specifications Subject to Change Without Notice.



ON SIDEWALKS



IN WASHROOMS



IN PLANTS



IN OFFICES

THE BENNETT MANUFACTURING COMPANY

ALDEN, NEW YORK

H MAINTENANCE PRODUCTS AND BUSES

1. Building Maintenance

Huntington Laboratories, Inc.	**H–1/Hu**
Advance Floor Machine Co.	H 5
The American Floor Surfacing Machine Co.	H 6
Clarke Sanding Machine Company	H 7
Continental Car-Na-Var Corporation	H 8
The Empire Varnish Company, Waterlox Division	H 9
The Fuller Brush Company	H 10
General Floorcraft, Inc.	H 11
Hild Floor Machine Company	H 12, 13
Hillyard Chemical Company	H 14, 15
Holt Manufacturing Company	H 16
The Kent Company, Inc.	H 17
Walter G. Legge Company, Inc.	H 18
Lincoln-Schlueter Floor Machinery Company	H 19
Multi-Clean Products, Inc.	H 20
Huntington Laboratories	H 21
National Vulcanized Fibre Co.	H 22
The Spencer Turbine Company	H 23
United Floor Machine Company, Inc.	H 24

2. Fence

Anchor Post Fence Division, Anchor Post Products, Inc.	H 25
The Colorado Fuel and Iron Corp.	H 26
Continental Steel Corporation	H 27
Cyclone Fence Department, American Steel & Wire Division, United States Steel Corporation	H 28
North American Iron & Steel Co., Inc.	H 29
The Stewart Iron Works Company	H 30

3. Grounds Maintenance

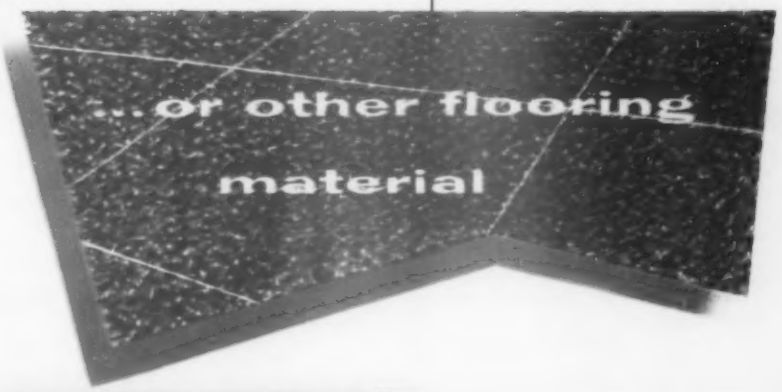
American Bitumuls & Asphalt Company	**H–3/AmB**
Devere Company	H 31
The Eclipse Lawn Mower Co., Division of Buffalo-Eclipse Corporation	H 32
Gravely Tractors, Incorporated	H 33
Kut-Kwick Corporation	H 34

4. Bus Transportation

Carolina Metal Products	H 35







it needs PROTECTION



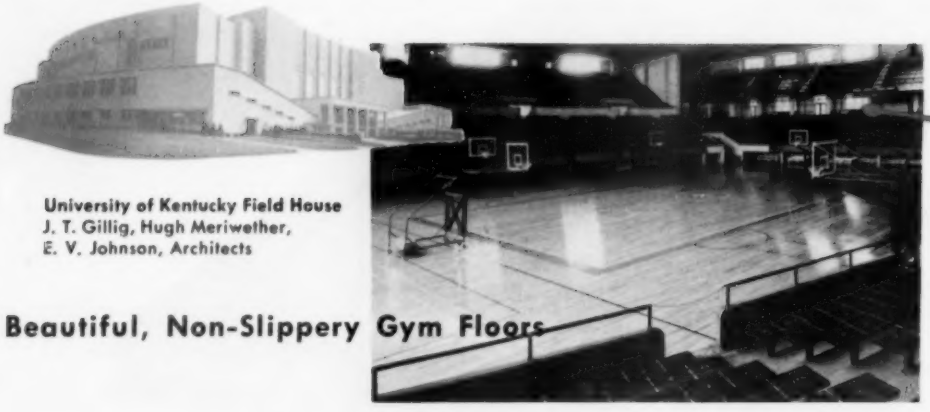


FLOOR FINISHES

HUNTINGTON Laboratories, Inc., Huntington, Indiana

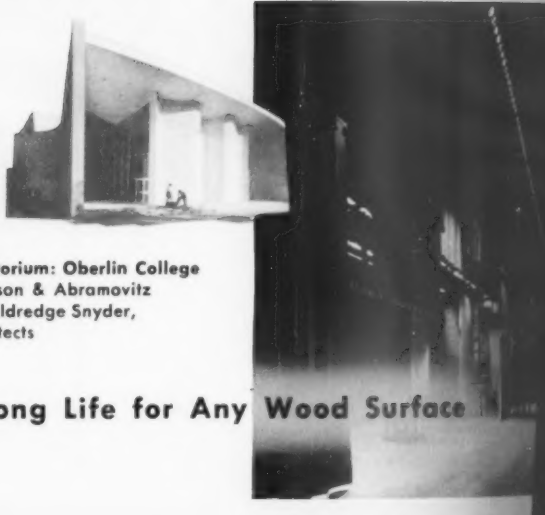
A.I.A. File No. 25G

Longer floor life.....



University of Kentucky Field House
J. T. Gillig, Hugh Meriwether,
E. V. Johnson, Architects

Beautiful, Non-Slippery Gym Floors



Auditorium: Oberlin College
Harrison & Abramovitz
and Eldredge Snyder,
Architects

Protection, Long Life for Any Wood Surface

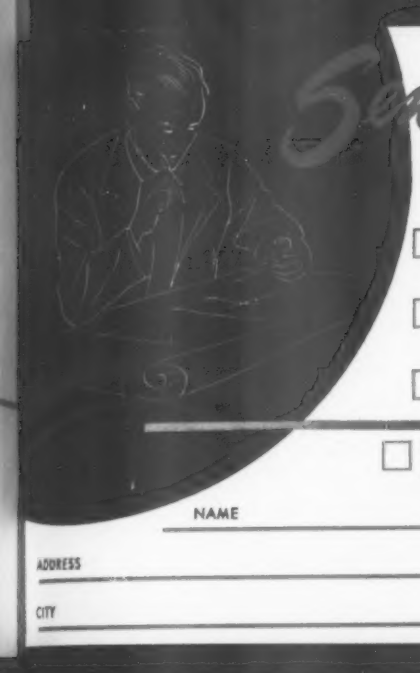


Bristol Memorial Hospital
Bristol, Tennessee
A. L. Aydelott & Associates,
Architects

Cure, Protect, Beautify Terrazzo Floors

ADDRESS

CITY



Send more information

ON HUNTINGTON FLOOR FINISHING PRODUCTS

- ☐ Seal-O-San Gym Floor Finish for wood.
- ☐ Penetrating Seal-O-San for wood classroom floors.
- ☐ Crystal Seal-O-San wood sealers.
- ☐ Safe-T-San Polish for asphalt tile gyms.
- ☐ Huntington Terrazzo Seal for terrazzo floors.
- ☐ Wade Seal Remover.
- ☐ _____

☐ Please have the Huntington Representative call on or about _____ (date).

NAME _____ TITLE _____

ADDRESS _____

CITY _____ STATE _____

Postage Will Be Paid by Addressee

No Postage Stamp Necessary If Mailed in the United States

BUSINESS REPLY CARD

First Class Permit No. 13, Sec. 34.9 P. L. & R., Huntington, Ind.

Huntington Laboratories, Inc.

Dept. CU-55

HUNTINGTON, INDIANA

ower maintenance costs

LOW COST PROTECTION FOR WOOD, TERRAZZO, CONCRETE, ASPHALT AND RUBBER TILE AND ALL FLOORS

FOR WOOD FLOORS SPECIFY SEAL-O-SAN® WOOD FINISHES

The nation's coaches, players and custodians are the best judges of gym floor finishes—their long time favorite is Seal-O-San. Seal-O-San gives them a non-slippery, glareless surface that's right for fast foot work, good team work. It is dependable for basketball and its quality means lower maintenance costs. Seal-O-San treated floors retain all the beauty of the wood.

Original application of any of the types of Seal-O-San described on page 5 is quite simple yet produces a surface that means longer wood life, greater protection from wear or weather, easier daily maintenance and substantial reduction of costly scrubbing and refinishing.

Seal-O-San is approved by both the Maple and Oak floor manufacturers' associations.

WAXES PROTECT ALL FLOOR SURFACES

Huntington has specialized in the development of self-shining, liquid waxes for use under heavy traffic conditions. Many products have been created to solve special problems of dampness, slipperiness, longer wax life, etc., for our customers. Three stand out as best for general use: Neo-Shine Concentrated Wax for greatest durability; Cosmolite Anti-Slip Wax for anti-slip qualities as well as high luster; and Weatherall Wax for protection against continuous moisture.

We also manufacture freezable water dispersed waxes, solvent-type waxes, static conductive waxes, as well as Safe-T-San Floor Polish.

These products have been developed for greatest protection to expensive floor coverings, ease of application and maintenance and elimination of wear. They are fully approved by floor covering manufacturers and accepted by Underwriters' Laboratories. If you have a special problem, ask for our recommendations.

A TESTED METHOD OF PROTECTING TERRAZZO

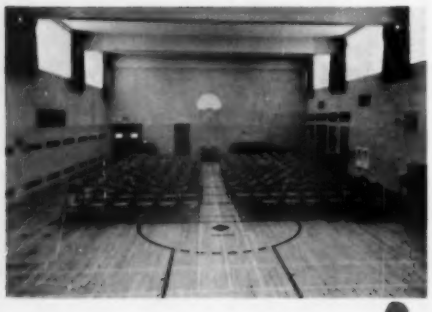
Huntington Terrazzo Seal has been used with great success in the curing of terrazzo floors before final grinding and polishing. It holds vital moisture in and slows the curing process to minimize cracking. It will help to keep terrazzo new-looking for extra years.

After the floor is polished, the Seal should be reapplied to protect the terrazzo against the harsh effects of cleaners, rubber marks and stains and discoloration. Being practically colorless, it will not darken light floors. It also reduces slipperiness.

thirty-five years' experience in the maintenance of public buildings

HUNTINGTON LABORATORIES

...Trouble free service

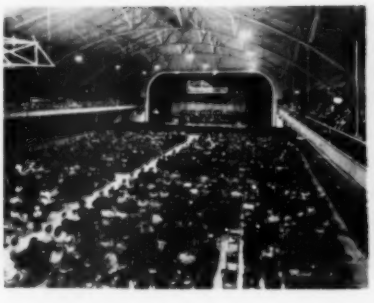


ON MULTIPURPOSE FLOORS SEAL-O-SAN STANDS UP, SAVES THE WOOD





Many gyms serve as community halls as well as playing courts, and for those floors, the protection of Seal-O-San is essential. It stands real punishment without destruction because the seal is in the wood not merely on the surface.







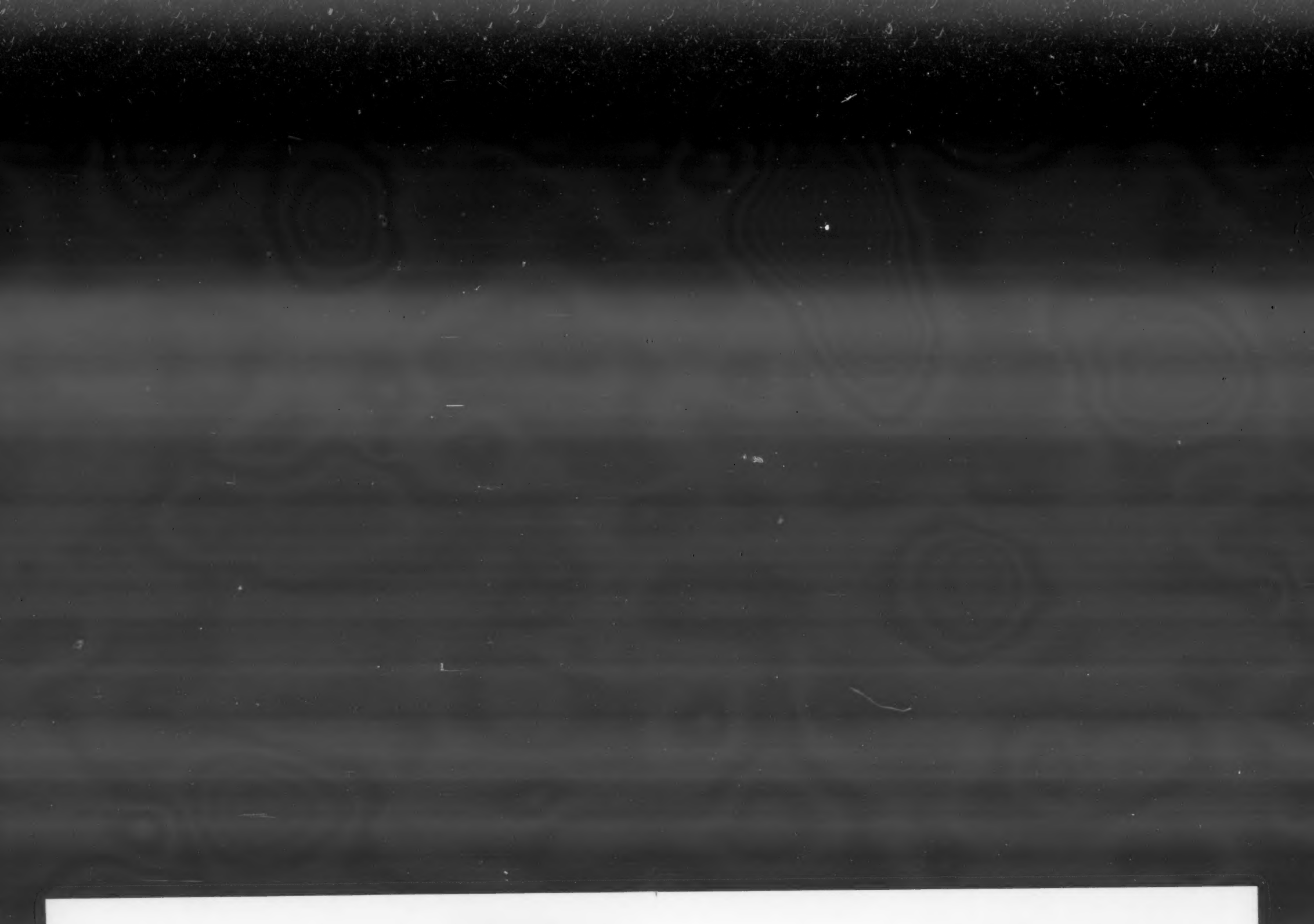
For years Huntington's customers have written about the tough use they give their Seal-O-San floors. Roller skating, dancing, seating for banquets and plays and a host of other activities are held on Seal-O-San surfaces. Rarely is the seal broken or scratched and seldom indeed is the hardwood damaged. This long experience with Seal-O-San enables us to guarantee satisfaction.



SAFE-T-SAN® MAKES ASPHALT TILE GYM FLOOR NON-SLIP

Safe-T-San is a special high luster floor polish that gleams like wax but is purposely wax-free so that it assures safe footing on any surface. Safe-T-San contains no harmful solvent, can be used on any flooring material. Its anti-slip ingredient, "Ludox," has proved its value in preventing costly falls. Specify Safe-T-San on asphalt tile gym floors, and on all floors that need anti-slip protection. Provides a hard plastic finish that can be renewed by buffing.







ARCHITECTURAL SPECIFICATIONS

HUNTINGTON

floor finishing products

	DESCRIPTION	SPECIFICATION
Gym Floors Need Seal-O-San Gym Floor Finish	A durable finish for hardwood gym floors—it is non-slippery, non-glare, scuff and rubber burn resistant—insures safe, sure footing. Easy to apply and maintain. Reduces costly scrubbing and refinishing. Maintenance men like Seal-O-San Gym Floor Finish.	Sand or clean floor thoroughly. Apply one coat of Seal-O-San, according to manufacturer's directions. Paint the court lines with Seal-O-San Gym Line Paint. Finish with two coats of Seal-O-San Gym Floor Finish. Steel wool between coats. Coverage: 500-600 Sq. Ft. Per Gal.
For Light, Glare-Free Gym Floors Use Crystal Seal-O-San	Crystal clear finishes are possible with Crystal Seal-O-San Gym Floor Finish. A practically colorless sealer that will not darken with age.	Crystal Seal-O-San is applied exactly like Seal-O-San Gym Floor Finish, above. Coverage: 500-600 Sq. Ft. Per Gal.
On Classroom Floors Apply Penetrating Seal-O-San	An ideal floor finish for hard and soft wood in halls, classrooms, and heavy traffic areas. Penetrating Seal-O-San sinks deep into the wood to protect and strengthen it. Seals cracks and crevices so dirt stays on top of the surface; no traffic lanes. Penetrating Seal-O-San is free-flowing and simple to apply and maintain. Crystal Penetrating Seal-O-San also available.	First sand or clean the floor thoroughly. Apply one or two coats of Penetrating Seal-O-San or Crystal Penetrating Seal-O-San in accordance with manufacturer's directions. Coverage: 400-500 Sq. Ft. Per Gal.
Deluxe Floors Need Super Seal-O-San	Super Seal-O-San contains the highest solids content of the four Seal-O-San finishes and is ideal as a top coat over Gym Floor Finish or Penetrating Seal-O-San. It makes one of the finest basketball playing surfaces attainable.	Apply one or two coats of Penetrating Seal-O-San or Seal-O-San Gym Floor Finish. Steel wool between coats. As a final coat, apply Super Seal-O-San according to manufacturer's directions. Coverage: 350-500 Square Feet Per Gallon.
Cure and Seal Terrazzo and Ceramic Tile with Huntington Terrazzo Sealer	Huntington Terrazzo Sealer cures unpolished terrazzo and protects the finished floor. It is waterproof, non-porous and unaffected by alkalis and alkali salts. It is colorless; won't darken floor. Prevents ceramic tile grouting from darkening. We recommend that Weatherall Wax be applied after the sealer on the finished floor for lasting protection.	Apply first coat of Huntington Terrazzo Seal, according to manufacturer's directions, before grinding and polishing. Allow floor to cure for at least six days. After polishing reapply one coat of Huntington Terrazzo Seal. Allow to dry. Coverage: 1,500 Sq. Ft. Per Gal.
Make Asphalt Tile Slip Resistant with Safe-T-San Polish	Safe-T-San is a high-luster anti-slip floor polish containing "Ludox." Safe-T-San gleams like wax, but is completely wax-free. Ideal for use on asphalt-tile gym floors, or any surface where there is a slip hazard. Contains no harmful solvents—easy to apply and maintain. Easily removed.	Follow floor cleaning recommendations of manufacturer. Apply two thin coats of Safe-T-San Polish according to manufacturer's directions. Coverage: 1,800 Square Feet Per Gallon.
Seal Concrete with Huntington Concrete Sealer	Huntington Concrete Sealer solves the problem of concrete dusting and dampness. Penetrates and fills concrete pores to form a tough surface that is easy to keep clean and impervious to water, grease and oil stains. If color is desired, Seal-O-San Concrete Enamel produces a beautiful, durable surface.	Clean floor. Apply Huntington Concrete Seal or Seal-O-San Concrete Enamel, according to manufacturer's directions. Apply additional coats until pores are filled. Coverage: approx. 300 Square Feet Per Gallon.
For Floor Marking Use Seal-O-San Gym Line Paint	Seal-O-San Gym Line Paint is the ideal product for use on gymnasium floors and playing courts. May be used for floor decoration. Available in red, white and black. Ask for folder on lining gym floors.	On new or sanded floors, determine court lines according to Official Rules. Apply first coat of Seal-O-San before painting court lines. On old floors, repaint worn lines prior to resealing.

ARCHITECTURAL SPECIFICATIONS

HUNTINGTON

floor maintenance products

	DESCRIPTION	SPECIFICATION
To Paint Concrete and Wood, Use Seal-O-San Enamel	On new or old concrete floors, borders of gym floors and locker room floors, apply 2 coats of Seal-O-San Enamel according to manufacturer's directions. Available in 8 different colors.	Apply one coat of Seal-O-San Enamel to clean floors according to manufacturer's directions. Steel wool between coats. Apply second coat. Wax to protect finish. Coverage: 400-500 Sq. Ft. Per Gal.
Safe, Economical Removal of Seal and Varnish with Wade	Wade Seal Remover is a non-flammable product designed to entirely dissolve and remove seal, paint and varnish from finished surfaces. Wade is positively safe—it can be used without danger of fire hazards in all buildings.	Apply Wade Seal Remover with Lamb's Wool applicator according to manufacturer's directions. For speed, in removal use Silent Huntington Floor Machine. Coverage: 75-100 Sq. Ft. Per Gal.
For Greater Beauty, Longer Floor Life, Use Neo-Shine Wax	Neo-Shine beautifies and protects floors. It provides a tough film of wax that resists the wear of extremely heavy traffic. Neo-Shine is easy to apply and maintain. It is made of the finest number one yellow carnauba wax and contains 18% solids, making it 50% richer in wax content than most self-polishing waxes.	Apply in 2 thin coats with Lamb's Wool applicator according to manufacturer's specifications. Coverage: 2,000-2,500 Sq. Ft. Per Gal.
For Anti-Slip Floors, Easy Maintenance, Apply Cosmolite Wax	Cosmolite Anti-Slip Wax is designed to prevent slips and falls and still provide wax protection and beauty for floor surfaces. It contains colloidal silica which prevents slipperiness but does not make the wax soft or tacky.	Apply in 2 thin coats with Lamb's Wool applicator according to manufacturer's specifications. Coverage: 2,000-2,500 Sq. Ft. Per Gal.
When Frequent Wet Mopping is a Problem, Try Weatherall Wax	Weatherall is a heavy duty floor wax designed to maintain a beautiful, blemish-free surface for long periods under heavy wet traffic and frequent damp mopping. It is made with the finest grade carnauba wax and contains 14% wax solids.	Apply in 2 thin coats with Lamb's Wool applicator according to manufacturer's specifications. Coverage: 2,000-2,500 Sq. Ft. Per Gal.

TRAINED HUNTINGTON REPRESENTATIVES

will gladly consult on school, hospital or industrial maintenance problems

Phoenix, Arizona — *E. J. Levernier*
El Cerrito, Calif. — *Bruce Wilcox*
Santa Barbara, Calif. — *R. E. Heidrich*
Denver, Colorado — *E. E. Goss*
New London, Conn. — *B. F. Deaton*
Tampa, Florida — *Nash Higgins*
Marietta, Georgia — *Norman Corey*
Aurora, Illinois — *James K. Murdock*
Chicago, Illinois — *Wray Norton*
Glencoe, Illinois — *W. E. Fox*
Oak Park, Illinois — *Bob Quinn*

Huntington, Indiana — *B. W. Brown*
Huntington, Indiana — *Hurley Feltman*
Huntington, Indiana — *J. C. Murdock*
Huntington, Indiana — *Charles Yaste*
South Bend, Indiana — *W. J. Cerney*
Vincennes, Indiana — *Richard Haflich*
Des Moines, Iowa — *R. B. Anderson*
Sioux City, Iowa — *Don Emmick*
Emporia, Kansas — *Earl Yoos*
Lexington, Kentucky — *A. W. Steinbrenner*
Harwich Port, Mass. — *C. S. Hughes*
Milwaukee, Wis. — *R. H. Lambrecht*

Albion, Michigan — *Don Christiansen*
Detroit, Michigan — *Clare Bristol*
Detroit, Michigan — *DeVaughn L. Clark*
Detroit, Michigan — *Arthur Jansheski*
St. Paul, Minn. — *Julian Sletten*
Jackson, Miss. — *William D. Haynes, Jr.*
Kansas City, Mo. — *H. M. Jackson*
Kansas City, Mo. — *Cliff Sterling*
Gardiner, Montana — *A. R. King*
Fremont, Nebraska — *Ray Muzzy*
Princeton, New Jersey — *Dave Livingstone*
Milwaukee, Wis. — *W. R. Van Winkle*

DeWitt, New York — *Harry Stetzel*
Munnsville, New York — *Walter Ferszt*
Pelham, New York — *George Pederson*
Thomasville, N. C. — *Doctor Morton*
Cincinnati, Ohio — *Carl Koch*
Columbus, Ohio — *Mott Brown*
Tiffin, Ohio — *Joe Rarick*
Wooster, Ohio — *E. E. Tunison*
Guthrie, Oklahoma — *B. M. Vitale*
Carlisle, Pa. — *Cliff Miller*
Lewistown, Pa. — *Ed Bresenhan*

Philadelphia, Pa. — *Everett Simpson*
Pittsburgh, Pa. — *Frank Fisher*
Chattanooga, Tenn. — *Wade Hampton*
Nashville, Tenn. — *Holmes Johnston*
Austin, Texas — *H. B. Ryan*
Dallas, Texas — *Fred Prater*
Dallas, Texas — *Mrs. J. W. Webb*
Ogden, Utah — *Harold Seaworth*
Roanoke, Va. — *Robert L. Scott*
Alexandria, Va. — *Jack Haney*
Seattle, Washington — *B. N. Gall*

TO HELP YOUR CLIENTS KEEP BUILDINGS LOOKING NEW, RECOMMEND OUR FREE MAINTENANCE MANUALS AND TRAINING FILMS.

HUNTINGTON HUNTINGTON LABORATORIES

HUNTINGTON LABORATORIES, INC.

Huntington, Indiana

Philadelphia 35, Pa.

Toronto 2, Ontario

Form No. 7401913

Litho in U.S.A.

ADVANCE FLOOR MACHINE CO.

2617 Fourth Street, S. E., Minneapolis 14, Minnesota



SPEEDBOY DELUXE

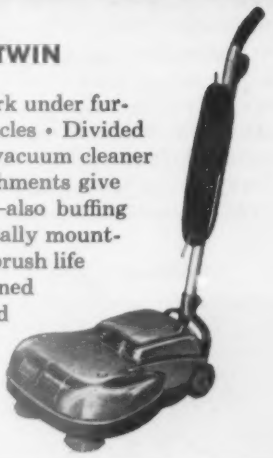
For heavy-duty polishing, waxing, scrubbing, steel wooling, shampooing • Advanced design • Positive, grease-free Silent-Flo Drive • Balanced for effortless, self-propelling operation • Fully adjustable handle • Automatic wheel control • Dual-control safety switch • The best you can buy!



4 MODELS	
24	19
16	14

LOWBOY TWIN

Specially designed to work under furniture and around obstacles • Divided weight—handles like a vacuum cleaner • Interchangeable attachments give you 4 types of brushes—also buffing pads • Brushes universally mounted to assure maximum brush life • Chassis rubber-cushioned • Available in single and twin brush designs.



4 MODELS	
21	16
15	13

GYRO 12

Priced to appeal to an entire new market • Exclusive 3-way adjustable handle for free-floating or self-propelling operation, plus vertical lock for storage • Silent-Flo Drive • Heavy-duty ⅓ h.p. motor • Weighs 42 lbs., perfectly balanced • Gives professional results at rock-bottom cost.



WAXES • POLISHES • SCRUBS • STEEL WOOLS

SPEEDBOY SPECIAL

Moderate-priced utility model of the Speedboy Deluxe • Provides dependable service at low cost • An outstanding value for any job • Ruggedly built, finest materials and workmanship • Balanced for effortless operation • Silent-Flo Drive • Optional adjustable handle.



2 MODELS	
15	12

SILENT-FLO DRIVE
With Flex-O-Gear on all
SPEEDBOYS



SILENT GREASE-FREE TROUBLE-FREE

SPECIFICATIONS

	Deluxe Models				Special		Lowboy Models				Gyro
	14	16	19	24	12	15	13	15	16	21	12
Spread Diam.	14″	16″	19″	24″	12″	15″	13″	15½″	16″	22½″	12″
Horsepower	½	¾	1	1½	¼	⅓	¼	⅓	⅓	½	⅓
Weight (net)	100	114	125	150	59	73	79	86	102	142	42

ADVANCE®

Advance Floor and Rug Maintenance Machines

THE AMERICAN FLOOR SURFACING MACHINE CO.

Literature on request . . . 516 S. St. Clair St., Toledo 3, Ohio

the NEW No. 1
floor maintenance machine line

- performance proved machines
- world-wide sales and service

Floor-King does 10 jobs!

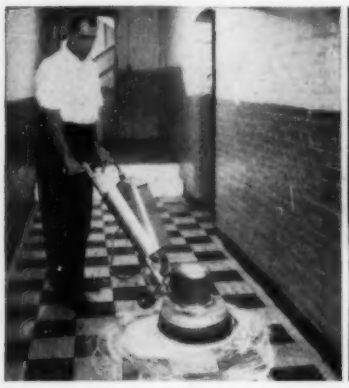
all new . . . astounding performance on any job, any floor, any rug!

The new Floor-King will wax, scrub, polish or steel wool any floor . . . even grind concrete or terrazzo with mere finger-tip guidance . . . easier for operator . . . lower costs for management . . . two complete lines to fit every budget! Easy-on, easy-off brushes can be put on or taken off in seconds *every time*—no tools are necessary. Handle adjusts instantly to height best for operator—detaches in seconds for convenient storage, easy transportation. Standard Floor-King, ½ to 1 H.P. in 14″, 16″ and 19″ sizes; Heavy Duty, ¾ to 1½ H.P. in 14″, 16″, 19″ and 23 ″sizes. Years ahead features and performance!

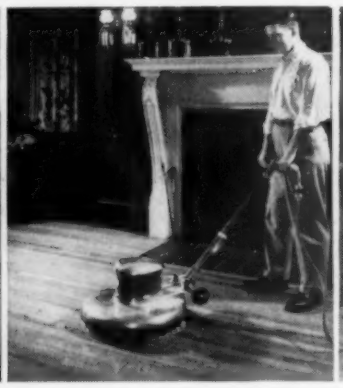


Waxing—Buffing

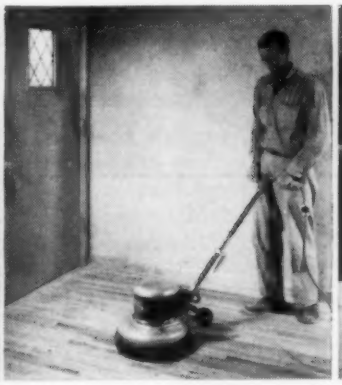
Scrubbing



Polishing



Steel Wooling



Terrazzo Grinding



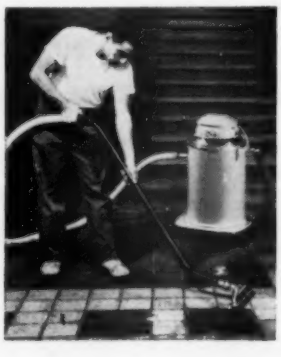
Water Pick-Up Machine

Speeds up the clean up! Squeegee type electric mop cleans 10,000 sq. ft. per hour! Large capacity unit, 17 gallon commercial-industrial vacuum comes complete with heavy-duty squeegee to quickly, efficiently recover suds and dirty water . . . makes a sanitary, dry 29-inch path. Converts to wet or dry hose-and-wand type cleaner in seconds.



Industrial Vacuum

All new wet or dry heavy duty . . . large capacity tank with extra powerful motor! The American Industrial Vacuum comes equipped for wet cleaning but quickly converts to a dry pick-up machine. Gives maximum vacuum efficiency with a minimum of operating expense. Unusually simple and easy to operate.



A.L.M. 13 Maintenance Machine

Solves your floor problems . . .

at low cost for smaller areas or as auxiliary machine to scrub, polish, wax, buff, steel wool or disc sand. Attachments on or off in seconds—no tools needed. Adjustable-detachable handle. Easy to operate, to carry, to store.





Dry cleans rugs,

large or small! ALM-13 with amazing float-action whirling brush ends back-breaking hand scrubbing . . . gets rugs really clean never digs, twists or tears rug fibers . . . saves you money and hours of hard work!

CLARKE SANDING MACHINE COMPANY

547 East Clay Ave., Muskegon, Michigan

Authorized Sales Representatives and Service Branches in Principal Cities
Distributed in Canada:
Clarke Vacuum Cleaners: G. H. Wood & Co., Ltd., P.O. Box 34, Toronto 14, Ont. *Clarke Floor Maintainers:* Strongridge Ltd., 124 Weston St., London, Ont.

YOU NEED IT... Clarke HAS IT!

Floor Care Machines For Virtually Every Requirement



Whatever type your floors, whatever the working conditions, there's a job-fitted *Clarke Floor Maintainer* exactly "right" for you. Quietly rugged and highly versatile, it scrubs, waxes, polishes, steel wools, sands and grinds; shampoos all carpeted areas. Adjustable handle and fingertip safety controls on every model. There's a *Clarke Vacuum Cleaner*, too, "suctioneered" for extra-powerful wet or dry pickup, and with just the right capacity for your particular needs. Compare Clarke performance! See how much more you'll get from every cleaning dollar.



Model WD-55
Capacity: 50 gal. wet, 6¼ bu. dry
For very large-area or high volume pickup

Model WD-23
Capacity: 15 gal. wet, 1⅞ bu. dry
Ideal for large areas

Model WD-15
Capacity: 8½ gal. wet, 1 bu. dry
For medium-large areas

Model QD-10
Capacity: 8½ gal. wet, 1 bu. dry
Especially quiet operation

Model BWD-18
Capacity: 12 gal. wet, 1½ bu. dry
Also serves as high-velocity blower

Model QD-5
Capacity: 2½ gal. wet, ½ bu. dry
Unusually portable, powerful



P-11
Brush diameter 11"
Brush speed 175 rpm
Motor ⅓ hp
Weight 34 lbs.

P-13
Brush diameter 13"
Brush speed 169 rpm
Motor ⅓ hp
Weight 82 lbs.

P-15
Brush diameter 15"
Brush speed 169 rpm
Motor ½ hp
Weight 100 lbs.

P-17
Brush diameter 17"
Brush speed 169 rpm
Motor ¾ hp
Weight 111 lbs.

P-20
Brush diameter 20"
Brush speed 141 rpm
Motor 1 hp
Weight 120 lbs.

P-23
Brush diameter 23"
Brush speed 141 rpm
Motor 1 hp
Weight 137 lbs.

OTHER CLARKE MACHINES include *Sanders* and *Edgers* for floors —*Smoothie Sanders* and *Duo Sander - Polishers* for woodwork, furniture, etc. Write for free literature or demonstration on any Clarke equipment.

Clarke SANDING MACHINE COMPANY
547 East Clay Ave. Muskegon, Michigan

CLEAN FLOORS PAY

CONTINENTAL CAR-NA-VAR CORPORATION

1663 East National Avenue, Brazil, Indiana, U.S.A.

Los Angeles (Calif.) Factory: 6630 S. McKinley Ave., Phone: PLeasant 3-2653

Practical, Efficient, Inexpensive

CAR-NA-VAR

Maintenance Aids

FOR SCHOOLS AND UNIVERSITIES

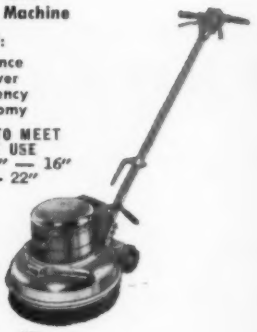
Only the Silent Chief Floor Machines Give You the Superb NEW UNIFLOW Gear and Motor Assembly!

Motor and gears are a complete and single unit! Vertical motor with parallel gear shafts give full efficiency for motor. This eliminates the 10 to 20% loss in the transmission of power found with worm gear type assembly. This means more power, smoother operation, greater savings in electricity.

SILENT CHIEF
Polishing Machine

GIVES YOU:
Balance
Power
Efficiency
Economy

5 SIZES TO MEET EVERY USE
12" — 14" — 16"
19" — 22"





SILENT CHIEF
Rug and Floor Scrubber
Ideal equipment for all floor, rug and carpet scrubbing.



SILENT CHIEF
Special "12" (12" brush)
Weighs Only 35 pounds!
Polishes—Scrubs
HIGH SPEED LOW COST!

Now also supplied in 14" model
Weight 45 lbs.



EMPTIES ITSELF
New Car-Na-Var Vacuum Cleaner does a faster, more efficient job!

Improved Self-Emptying Elect-O-Vac now "Fool Proof" with By-pass motor.

NOW! No dirty dust bag to empty . . . no need to remove the lid . . . Simply give top lever ¼ turn . . . contents are forced out through the hose.

For Sweetest, Easiest Cleaning ever . . .
"BEE-HIVE"
Vacuum Cleaner
Now Pick Up Dirt, Metal And Other Matter . . . Water And Other Liquids Without Special Adjustment . . . Ideal For Sucking Or Blowing!

Unbelievably Low Price



CLEAN-O-SHINE A floor cleaner of a creamy consistency made from pure linseed oil and free from alkali, acids, abrasives, and therefore harmless to the finest finish; at the same time it is a highly efficient cleaner.

SANI-SOLVE A phenomenal new cleaning compound in liquid form. Not a soap. Adaptable for all washable surfaces in hard or soft water. Needs no rinsing.

CAR-NA-SEAL Especially adapted for gym floors. Floor sealer made of 100% Bakelite resins and tung oil—a penetrating surface seal for wood and other porous floors—tough as leather and thoroughly pliable. Made by Scientific Dowtherm Process. Approved by Maple Flooring Ass'n.

IN-SEAL A deep penetrating seal for "raw" wood or other porous surfaces. Recommended where no surface coating is wanted. Approved by Maple Flooring Ass'n.

CAR-NA-CRETE The super-surfacer for concrete floors. Made of rubber. Dries to a hardness 90% that of plate glass. Proof against moisture, alkali, gasoline, oils, etc. Resists hydrochloric, nitric, and sulphuric acids up to 50% concentrations. Resists water, heat, cold, and abrasion, also, high concentrations of lye.

CAR-NA-VAR Liquid floor wax and varnish combined. For all floors except asphalt and rubber. Must be buffed. Supplied in natural and colors. Approved by Underwriters' Laboratories.

CAR-NA-LAC A finish for floors which, in effect, is a lacquer made of wax. Self-leveling. Dries with high gloss. Approved by Underwriters' Laboratories for safety and Rubber Mfg. Assn. for rubber floors.

CONTINENTAL "18" Super finish for floors. Exactly the same as Car-Na-Lac except that it contains about 38% more solids than the average product of this type. Approved by Underwriters' Laboratories for safety. Also Rubber Mfg. Assn. for rubber floors.

GRIP-KOTE An anti-slip finish for floors. Especially adapted for asphalt tile. Approved by Underwriters' Laboratories for safety. Has 60% higher coefficient of friction than required, giving a safe footing on a fine, long wearing water-resistant finish. Applied with wax applicator. May be buffed when needed. Used successfully on asphalt gymnasium floors. Also approved by Rubber Mfg. Assn.

TERRA-PLATE New crystal clear, non-yellowing sealer for terrazzo, also adapted for marble, concrete, metal and wooden surfaces where quick drying is desired.

WRITE FOR DEMONSTRATION and more information on Car-Na-Var School Maintenance Aids.

THE EMPIRE VARNISH COMPANY

WATERLOX DIVISION

2638 East 76th Street, Cleveland 4, Ohio

WATERLOX (TUNG-OIL) PRODUCTS

WATERLOX TRANSPARENT

A tung-oil product, it penetrates deeply into the pores of hard and soft wood, metal, cement and stucco, and prevents deterioration caused by moisture, salt air and water, acids and fumes and alkali. Elastic from a minus 70° to plus 700°F., it does not crack, chip or peel, and offers the greatest protection against all kinds of wear in a tough lasting finish.

An excellent floor finish—interior or exterior—and the finest protective coating for natural woodwork and furniture and also for window sills, trays and surfaces where moisture is encountered. Used as a vehicle with paint or enamel, it adds to the durability of either, enhancing both the life and beauty of the coating.

Waterlox Transparent, with its moisture-control feature, is used extensively for the decoration and protection of homes, factories, apartments, hotels, hospitals and institutions.

Write for a Waterlox Specification Chart!

WATERLOX HEAVY DUTY GYM FINISH

A new Waterlox Product designed as a quality finish of the greatest durability for gymnasium and club floors. Flows easily. Levels evenly. Dries quickly. Tough, though flexible, it is equally fine as a final finish on a sanded floor, a refinish on a sealed floor, or a top coating. Approved by the Maple Flooring Manufacturers Association.

WATERLOX HEAVY BODY FINISH COAT

Contains no wax or paraffin and expands as it dries to a transparent high gloss finish. Intensifies the color over which it is applied. An excellent final coating on hardwood floors, table and desk tops, wood or metal.

WATERLOX CEMENT FLOOR STAIN

Not a paint, not a dye, but a blend of Waterlox Transparent and a skillfully developed pigment into a bright, colorful stain which combines greater durability with all the hiding qualities of the best cement floor paints. Appearance, long life and economy are joined to give you the most for your money. Six gay, sparkling colors give you a choice of coatings to brighten the cement-floored room.

WATERLOX FLAT-COAT

A high-hiding, oil base, flat paint processed with beautiful lime resistant colors. Spreads freely and covers smoothly over porous new plaster or wallpaper to gain painters' acclaim.

WATERLOX NATURAL SATIN FINISH

It has a satiny or wax-like luster on the surface on which it is applied although it contains no wax. This finish brings out the rich natural color found in wood without a shining gloss and is especially suitable for floors, furniture and wood trim. The final effect is that of a high-gloss material rubbed to a dull finish. Waterlox Natural Satin Finish is used as the final coat after the application of two coats of Waterlox Transparent as a penetrating sealer. This provides a water resistant surface that stands up under constant use and eliminates moisture stains. It is easy to clean and is quickly renewable.

WATERLOX WEATHER-CIDE

It is a new, special outside weather finish. This coating is designed to protect natural wood surfaces subject to the rigors of weather. Natural wood siding, doors, railings and trim are most completely protected against the elements when coated with Weather-cide.

WATERLOX ENAMEL

An enamel with a tung-oil base processed for use in places where moisture control is required. Dries without odor or fumes. Colors harmonize with modern color schemes. Will not crack, chip or peel after repeated washings and can be baked at temperatures from 200°F. to 275°F. Extremely efficient in hospitals, laundries and kitchens on wood or metal.

WATERLOX HADES ALUMINUM

Expressly formulated for protection of metal surfaces subject to extreme heat. Metal plates coated with Hades Aluminum can be heated to a cherry red and when cool, return to original color without flaking or peeling.

WATERLOX ALUMINUM PAINT

Complete protection for interior or exterior metal surfaces vulnerable to oxidation, acid or alkaline deterioration, or moisture. The finish for water or oil tanks, sewage plants and other outside metal finishes.

OTHER PAINT AND VARNISH PRODUCTS

In addition to products described in this catalog, we feature a complete line of varnishes, stains, enamels, and other products of interest to the architect and contractor. Detailed information on any of these will be furnished gladly on request.

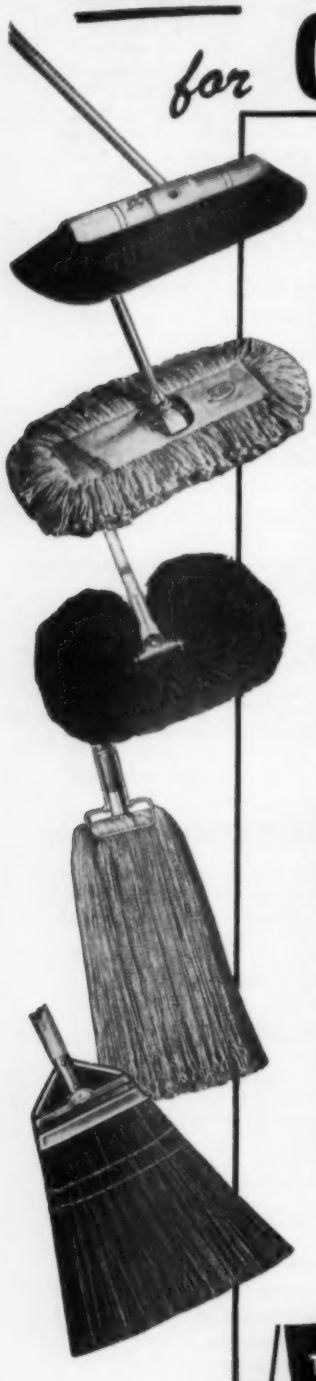
DESCRIPTIVE FOLDERS

Floor Maintenance — Uses and Facts
Cement Floor Stain — Masonry Coating
General Painting — Water Repellant
Specification Chart — Color Cards
WRITE THE MANUFACTURER!

THE FULLER BRUSH COMPANY

3566 Main Street, Hartford 2, Conn.

ALL THE TOOLS *for* CLEANING SCHOOLS



FLOOR BRUSHES

Brush materials include nylon, bristrand, horsehair, fiber and mixtures, geared to the job. 12" to 36" widths. Full, firm sweeping surfaces that wear down evenly. Solid hardwood blocks.

LAUNDERABLE SWEEPING MOP

Fully washable, 4-ply cotton yarn with long trim. All in one piece. Pre-shrunk canvas backing . . . easy to replace. Zipper opening does away with tape ties. In widths from 12" to 48".

DRY MOPS

Three sizes — 36" x 12", 18" x 11", 12" x 8½". Sanitary. Cleans your floors thoroughly in a jiffy.

WET MOPS

Maximum absorbency, easy rinsing, long wearing. Three types of construction — narrow tape, wide tape, solid head in 12, 16, 20, 24, and 32 ounce weights. Made of 4 ply, 9 ply and 30 ply long staple cotton yarns.

FIBER BROOMS

Long-wearing fibers, set in metal case, wear down evenly...do not heel over...are not affected by water.



BENCH BRUSHES

Wood back or Fullergript construction. Made in a wide variety of materials including horsehair, fiber, bristrand and various mixtures.

PAINT BRUSHES

For every painting and varnishing job — pure bristle, 70% bristle 30% horsehair mixture (U.S. Gov't. Regulation), and 100% nylon brushes.

WAXES, POLISHES & CLEANERS



FULLUSTRE SELF POLISHING FLOOR WAX . . . dries with a bright lustre without buffing.

LIQUID FLOOR CLEANER . . . quick-action. Safe for all floors. Highly concentrated.

FULLTROL . . . a deodorizing cleaner and sanitizer. Kills germs.

FURNITURE POLISH . . . oil or cream style. Leaves no film.

METAL POLISH...non-inflammable. Gives long-lasting finish.

Also: cotton dusters, scrub brushes, toilet brushes, test tube brushes, bottle brushes, tumbler brushes, window brushes, venetian blind brushes, radiator brushes, wall brushes, squeegees (floor and window), wax applicators.

The **FULLER** BRUSH COMPANY
3566 Main Street
HARTFORD 2, CONN.

FOR INFORMATION WRITE TO . . .

ATLANTA, GA., LOS ANGELES, CALIF., DALLAS, TEXAS, HAMMOND, IND. OAKLAND, CALIF., ST. PAUL, MINN., SEATTLE, WASH., TOLEDO, OHIO

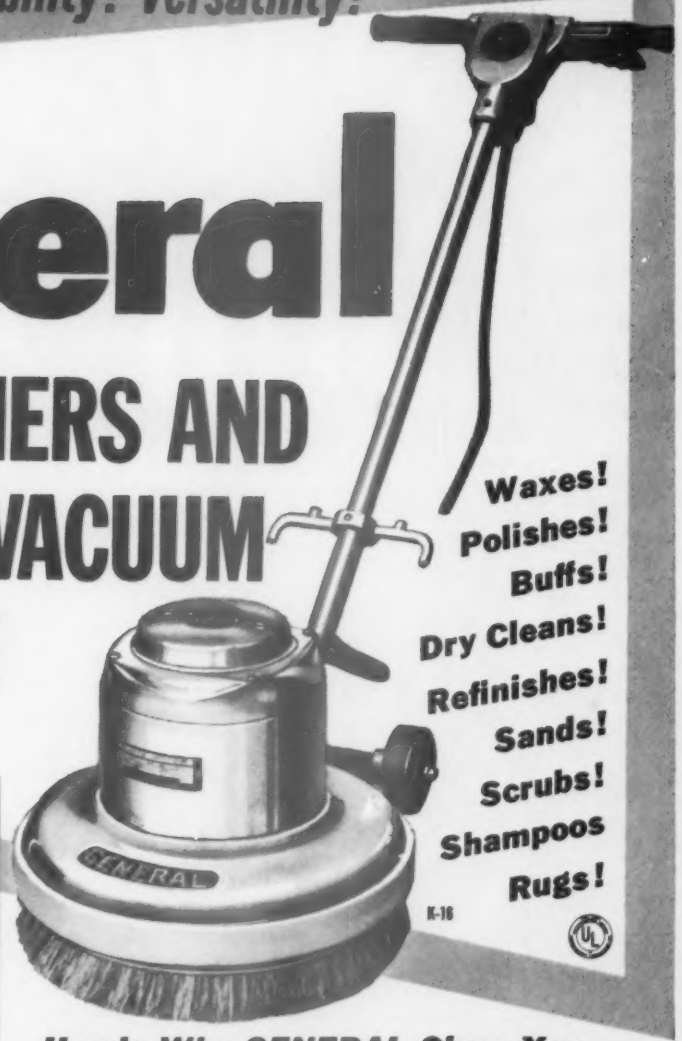
GENERAL FLOORCRAFT, INC.

421 Hudson Street, New York 14, N. Y.

Famous for Economy! Durability! Versatility!

General

FLOOR POLISHERS AND COMMERCIAL VACUUM CLEANERS!



Waxes!
Polishes!
Buffs!
Dry Cleans!
Refinishes!
Sands!
Scrubs!
Shampoos
Rugs!

K-16



66

NEW!

General Commercial Vacuum Cleaner!

More Horsepower! *More* water lift! *More* air volume! 1¼ H.P. By-pass Air Cooled motor for quicker . . . more powerful . . . trouble-free operation on dry and wet pickup!

HOSE ATTACHES IN 1/2 SECOND FLAT!

Revolutionary ball bearing, swivel, snap attachment is world's quickest by stop-watch test! Ends coupling and uncoupling time-waste!

Here's Why GENERAL Gives You Maintenance-Free Operation!

1. **Operating Ease!** Industry's most perfectly balanced machine!
2. **Cost-Cutting!** Does toughest jobs fastest and finest!
3. **Economy!** Designed by floor-wise engineers with over 30 years experience!
4. **Durability!** Engineered for continuous duty!
5. **Versatility!** Works wonders on wood, asphalt tile, marble, rubber, linoleum, cork, terrazzo!
6. **Value!** Generals are known as the ultimate in floor machines!

General FLOORCRAFT, INC.

421 HUDSON STREET • NEW YORK 14, N.Y.

WORLD'S MOST COMPLETE LINE!



HILD FLOOR MACHINE COMPANY

740 W. Washington Blvd., Chicago 6, Illinois

HILD

FLOOR MAINTENANCE EQUIPMENT .....

Finished wood, linoleum, rubber, tile, terrazzo, concrete . . . you name the floor surface, HILD floor machines can clean it! HILD equipment is designed for easy and safe operation . . . built for long, trouble-free service . . . proved in use for over 27 years. Easy to operate . . . even inexperienced operators can learn to use HILD machines quickly. As compared to antiquated cleaning methods, Hild Scrubber-Polishers and Vacuums cut floor maintenance costs to a fraction. And Hild-cleaned floors look and stay brighter, leaving impressions of cleanliness and efficiency.

..... Cleans all floors

QUICKLY!...EFFICIENTLY!

HILD SCRUBBER-POLISHERS

Choose the model to fit your particular needs... every model a work-horse to serve you without trouble year after year. Self-propelling . . . glides easily to right or left when handle is raised or lowered. Safety switch turns off current automatically when operator's hand is removed from handle. With easily interchangeable attachments, just one HILD Scrubber-Polisher can be used to scrub, wax, polish, buff, sand, grind or steel-wool floors of all kinds. Brush scrubs right up to baseboards, walls and other obstacles. Four larger models have handles adjustable to operator's height. All models have non-marking rubber bumpers and wheels, and plastic non-scratching hand grips. Continuous duty motor mounted in rubber to eliminate noise and vibration.



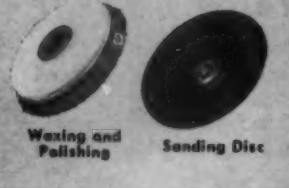
Model C

SIX MODELS TO FIT EVERY NEED

INTERCHANGEABLE ATTACHMENTS FOR EVERY FLOOR NEED



Buffer — Steel Wool



Waxing and Polishing — Sanding Disc

ALL MODELS AVAILABLE WITH TANK ON HANDLE FOR SHOWER-FEED FLOOR SCRUBBING

HILD Shower-Feed Scrubbing gets floors clean with the least amount of scrubbing solution . . . preventing damage that may result from water-flooded floors . . . and reducing cost of soaps and detergents. Hild Scrubber-Polishers with tank are ideal for rug and carpet shampooing. Tank-type models can also be used for floor polishing. Tank holds 3 gallons of cleaning solution.

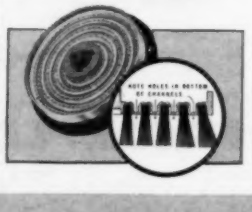


SPECIFICATIONS: HILD Floor Machines

	"JUNIOR"	MODEL "A"	MODEL "V-A"	MODEL "C"	MODEL "UC"	MODEL "D"
MOTOR (Heavy Duty)	GE	GE	Leland	GE	GE	GE
Horsepower	½	½	½	½	¾	1
ELECTRIC CORD: Length	40 ft.	40 ft.	40 ft.	40 ft.	40 ft.	50 ft.
Gauge of Wire	16	16	16	14	14	12
BRUSH: Diameter of Spread	11 in.	14 in.	14 in.	16 in.	16 in.	19 in.
Diameter of Brush Block	9½ in.	12 in.	12 in.	14 in.	14 in.	17½ in.
Speed (R.P.M.)	180	180	172	172	172	172
WEIGHT: With Wood Back Brush, and Electric Cord	53 lbs.	64 lbs.	80 lbs.	99 lbs.	104 lbs.	128 lbs.
Additional Specifications for Shower-feed Machines with Tank						
TANK CAPACITY	3 gal.	3 gal.	3 gal.	3 gal.	3 gal.	3 gal.
WEIGHT: With Shower-feed Brush, Tank and Electric Cord	65 lbs.	76 lbs.	92 lbs.	113 lbs.	118 lbs.	146 lbs.

Specifications subject to change without notice.

GUARANTEE: Hild equipment is guaranteed by the Hild Floor Machine Company for one year from date of delivery against defects in materials and workmanship.



ONLY HILD HAS THE PATENTED SHOWER-FEED BRUSH

Cleaning solution from the supply tank on the handle is fed onto the back of the brush where it is distributed to the channels running around the hub. Accurately spaced holes penetrating brush back between each row of bristles permit even distribution of solution under entire brush area.

HILD FLOOR MACHINE COMPANY

740 W. Washington Blvd., Chicago 6, Illinois

HILD
VERSATILE VACUUMS

PERFORM NUMEROUS CLEAN-UP JOBS FROM FLOOR TO HIGH-UP SHELVES . . . serve as useful partners to Hild Scrubber-Polishers



Numerous attachments, available at low cost, enable all Hild vacuums to do a great variety of clean-up jobs, even in hard-to-reach places

HILD WET and DRY VACUUM

This multi-purpose vacuum provides you with the most efficient means of drying floors after scrubbing with Hild's Scrubber-Polisher. Besides, this vacuum does important clean-up jobs by itself . . . removes dirt and dust from floors, walls, overhead pipes, shelves, lockers and other hard-to-clean places. The Hild Wet & Dry Vacuum can be used without adjustment or change of filters to pick up either liquids or dry dirt. You'll find so many uses for this machine, it will soon pay for itself in clean-up time and manpower saved. One of the many attachments available at low cost is a Hi-Up Extension Tube which permits removal of dust from shelving and other high-up places without showering dust onto floor. As all HILD Vacuums, this machine is simple to operate and is constructed for long, hard use.

Model 115 . . . 10 gallon capacity
Also available in 6 gallon capacity size . . . Model 106



HILD
HEAVY DUTY WET and DRY VACUUM

Designed for bigger jobs. Large 55 gallon tank has capacity for 40 gallons of recovered liquid and 5 bushels dry pick-up. Bi-Pass motor prevents moisture damage. Heavy steel dolly rolls easily on two wheels and caster with ball-bearing swivel. All Hild vacuum attachments fit this machine.

Model 155. 40 gal. cap.



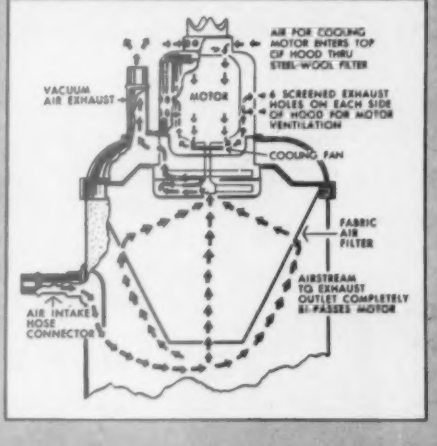
HILD
LIGHTWEIGHT DRY VACUUM

A powerful, sturdy, low cost vacuum designed for dry work only. Air Stream scientifically controlled to throw picked-up dirt against the sides of the dust container, thus eliminating clogging of the internal fabric air filter.

Model 215. . . . 10 gal. cap.
Also available in 6 gallon capacity size—Model 206.

HILD BI-PASS MOTOR PREVENTS MOISTURE DAMAGE

HILD Wet and Dry Vacuums are always ready for either wet or dry clean-up jobs. Moisture in the vacuum air-stream cannot damage the specially-designed Hild Bi-Pass motor which has its own independent cooling system.



24 Models for Every Floor, Rug and Upholstery Need

Vacuums • Scrubber-Polishers • Upholstery Shampoo Machines
Pile-Lifters • Carpet Beaters • Co-ordinated Supplies

Write Today for Information

HILD FLOOR MACHINE COMPANY
740 WEST WASHINGTON BOULEVARD • CHICAGO 6, ILLINOIS
Factory Branches: 250 E. 43rd St., New York 17 • 4271 W. Third St., Los Angeles 5, Cal.

HILLYARD CHEMICAL COMPANY

215 Robidoux, St. Joseph, Missouri

Warehouses in Principal Cities

48 Years as Manufacturer of FLOOR TREATMENT • MAINTENANCE • SANITATION PRODUCTS • and EQUIPMENT
Specialized for wood • asphalt • rubber • linoleum • terrazzo • magnesite • tile • cement

new *Hillyard* FLOOR SURVEY*



Your survey comes bound in this Modern Floor Treatment Manual with product sheets and specifications to fit individual needs.

***compiled especially for You...**

to answer your questions on particular floor treatments

From Survey to Service... *"On Your Staff... Not Your Payroll"*

A Hillyard floor treatment plan can mean real savings to you. After a complete survey of your floors a recommendation will be presented to you. You'll find a Hillyard survey can bring benefits of labor and materials savings.



WRITE TODAY
There's No Cost—
No Obligation

A qualified trained floor "Maintaineer" will make your survey. Half a century of experience and leadership stands back of his recommendations.

FLOOR HILLYARD TREATMENTS

Proprietary Chemists
Since 1907

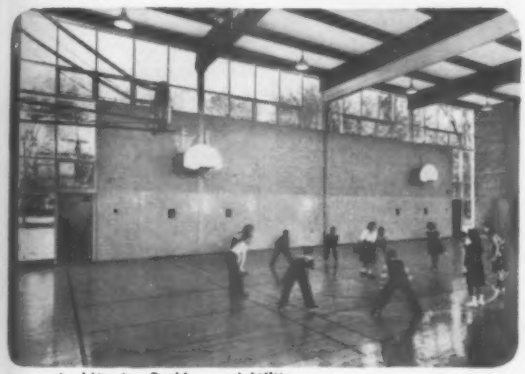
215 Robidoux
ST. JOSEPH, MISSOURI
Branches and Warehouse
Stocks in Principal Cities

HILLYARD CHEMICAL COMPANY



Architects—Perkins and Will
Westmere School, Guilderland, N. Y.
Beauty and comfort underfoot will not diminish with years of constant school traffic. Under the supervision of the Hillyard Maintaineer, asphalt tile corridor was treated first with Hillyard HIL-TEX, finished with slip-resistant SUPER HIL-BRITE WAX.

Choose Your FLOOR TREATMENTS as Carefully as you Choose Your Architect



Architects—Perkins and Will
Paige School, Schenectady, N. Y.
Hillyard TROPHY SEAL and Finish has been specified for all gym and recreational floors—for a lighter, smoother playing surface with great slip-resistance and controlled light reflectivity. Hillyard Maintaineer in New York territory helped maintenance staff with gym finishing without charge.

FAMOUS SCHOOL ARCHITECTS SPECIFY HILLYARD

floor treatments for noteworthy educational installations. Busy specifiers, nationwide, find that Hillyard products are easy to use, consistently dependable, cost less to maintain, and a Hillyard Maintaineer is always close at hand to offer experienced guidance in labor-saving methods.

Follow the example of school building designers, who have chosen Hillyard products many times for their lasting beauty, tough resistance and maintenance economy. And depend on the Hillyard Maintaineer near you for advice and help with any floor problem. Hillyard puts him "on your staff not your payroll."



Architects—Perkins and Will
Heathcote Elementary School
Scarsdale, N. Y.



Architects — Perkins and Will
Altamont Elementary School, Altamont, N. Y.



There's a HILLYARD *"Maintaineer" near you*
Write
215 Robidoux
ST. JOSEPH, MO.
San Jose, Calif. • Passaic, New Jersey



"You know it's right when it comes in the checkerboard drum"

HOLT MANUFACTURING COMPANY

Room C4, 669—20th St., Oakland 12, Calif. 272 Badger Ave., Newark 8, N.J.

CUT OUT COSTLY HAND CLEANING...

use **HOLT**

Floor Maintenance *Machines*

Wide Choice Enables You to Select Right Machines For Your Exact Needs and Budget

All HOLT floor maintenance machines are ruggedly built, include these special features:

- Non-marking rubber bumpers and cables — no unsightly marks on baseboards, walls, etc.
- Safety handgrip control to stop machine instantly, prevent runaways.
- No static shock—rubber grip, rubber trigger, and static eliminator wire in brush.
- Ball-bearing motors grease sealed for life.



HOLT All-Purpose Polisher . . . with interchangeable attachments . . . removes old wax, degreases concrete floors; scrubs tile, marble, terrazzo; cleans and waxes in one operation; steel wools, buffs, pumices, grinds; shampoos rugs and carpets, etc. Patented, self-levelling brush bracket cuts out "hop," reduces operator fatigue and brush wear. Brush spreads 12" to 20".

Specially-built explosion-proof, corrosion-proof machines for shipboard and hazardous industries also available.



HOLT Rug Shampoo Machine scrubs and shampoos grimiest rugs and carpets "whistle" clean. Converts quickly for waxing, polishing, steel wooling, tough floor maintenance. Brush sizes 12" to 20". Also tank-over-motor models with twin handles.



HOLT Heavy-Duty Vacuum has 60-inch water lift, handles both wet and dry pick-up without changing bag. Recommended for wet pick-up when completing rug scrubbing and shampooing, wet clean-up of floors, and heavy-duty dry pick-up. 15-gallon tank rust and corrosion-proofed. Easily converted to blower. Medium-duty, VA6, for small buildings.

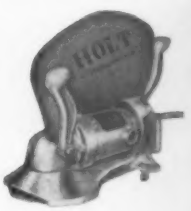


HOLT Whirlwind Upholstery Scrubber can't be beat for scrubbing and shampooing upholstery, small rugs, hard-to-reach corners and stairway runners. Marine-type pump provides positive solution feed to brush—no hand pumping. Motor and solution regulated by brush head controls for instant shut-off—no danger of flooding. 7-gallon tank; weight 70 lbs., easy to handle.



Refinish floors yourself with **HOLT Sanders.** Easy to handle, smooth operating.

HOLT Rotary Edgers make easy work of sanding edges, corners, stairs, closets, etc.



Sales and service centers in major cities. Write NOW for descriptive literature, prices and name of nearest distributor.

More than 25 years experience building **better** floor machines.

HOLT MANUFACTURING COMPANY

THE KENT COMPANY, INC.

174 Canal Street, Rome, New York

KENT

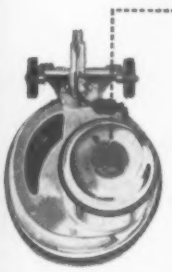
CUTS LABOR COSTS 18.9%

Time after time, in actual usage tests, Kent Floor Machines out-perform competitive makes slicing labor costs by as much as 18.9%! Typical are test results obtained by a major user who recently standardized on Kent 17" machines. Five separate time tests were made on 3850 sq. ft. of floor area. The Kent 17" won each test. The final report—"On entire 40-acre floor space, Kent will save 6142½ minutes — 102 man-hours per 5-day week."

Here's what you save

Kent's Balanced Power Machines pay for themselves by producing savings like these when compared with ordinary makes:

If your floor area is —	Hours saved annually (polishing three times a week)	Money saved annually @ $1.25 per hr. wage
24,000 sq. ft.	210 hrs.	$262.50
30,000 sq. ft.	242.1 hrs.	302.64
36,000 sq. ft.	315 hrs.	393.75
50,000 sq. ft.	438 hrs.	547.50



Balanced Power is the Key

Imperfect balance and torque — sidewise pull of the motor — make ordinary floor machines difficult to operate. Kent solves this problem with the exclusive OFFSET MOTOR DESIGN that counterbalances handle weight and minimizes torque. The result is BALANCED POWER. That's why Kent machines, operated by man or woman, steer with finger-tip ease — permitting *faster* work . . . causing *less* fatigue. Kent's Balanced Power also means that *all weight is on the brush,* distributed evenly so the job is done better . . . so brushes wear evenly and last longer. Plus:

- **FLOATING POWER** . . . another Kent exclusive that gives you extra years of trouble-free service — gears are cushioned to withstand shock . . . power flows smoothly from motor to brush.
- **ONLY 2 GEARS** . . . no chains or belts to adjust or replace.
- **HANDLE THAT ADJUSTS FOR OPERATOR'S HEIGHT.**
- **FULLY ENCLOSED MOTOR** . . . protects from dust and dampness . . . reduces maintenance problem . . . seals in noise.
- **SEALED GEAR CHAMBER** . . . assures positive lubrication for all moving parts.
- **AUTOMATIC RELEASE SWITCH** on handle assures full control at all times.

Write for further information

Kent Co., 174 Canal St., Rome, N.Y.

KENT — PIONEER IN MAINTENANCE EQUIPMENT SINCE 1913

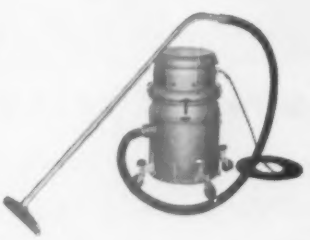


Kent's famous cleaning team — a K-line floor machine and a Quiet Triple Power Vacuum Cleaner (for dry or wet pickup).



K-LINE

Floor machines of 11, 13, 15, 17, 19, and 22-inch brush diameter with famous Offset Motor Design are available



VACUUM CLEANERS

For wet or dry work, both the Quiet Triple Power (illustrated in photo at top of page) and the new Quiet Jumbo (at left) have a special by-pass motor . . . no dust or moisture from vacuum stream can enter motor and cause damage. A smaller size also available.



BOILER CLEANER

The Kent Suction Vacuum, with special attachments and auxiliary 27-gallon soot tank, cleans boiler flues faster . . . ends messy clean-up job.

WALTER G. LEGGE COMPANY, INC.

The Legge System of Safety Floor Maintenance

Architects' Building, 101 Park Avenue, New York 17, N. Y.



ONLY ONE WAY TO GET ALL 4!

- *Safer footing*
- *Longer-lasting floors*
- *Sparkling appearance*
- *Lower maintenance costs*

LEGGE Safety Maintenance gives you all this *Plus* The Free Services of a Trained Safety Expert

LEGGE Maintenance means more than just a product in a can. It provides the "know how" of a Safety Technician at no expense to you.

He analyzes the composition, area, age, condition and type of traffic your floors absorb. He prescribes products custom-tailored to your needs and plans a daily maintenance program. He conducts on-the-job training classes for your crews. He calls back frequently to offer assistance and advice.

It all adds up to: 1) Floors that gleam, without slipperiness. 2) A reduction of as much as 98% in slip-accidents. 3) Greater longevity — LEGGE-Maintained floors often last up to *10 years longer*. 4) A saving of up to 33⅓ on floor maintenance costs.

LEGGE SAFETY FLOOR CLEANERS

TEXINOL: An all-purpose concentrate for surfaces which cannot be harmed by water. Cleans thoroughly, economically, leaving no slippery film on floors.

TEXSPAR: A heavy-duty paste concentrate. Effective on cleaning tasks considered too difficult for ordinary cleaners.

TRAFCO CLEANER: A slip-resistant solvent that prepares floors to be polished with TRAFCO and TRAFLECO. Removes dirt, old wax and rubber burn marks.

FLOORSHINE: For terrazzo, marble, travertine, quarry tile, other hard-surface floors. Combination cleaner and slip-resistant polish. Also effective as secondary maintenance on other polished floors.

Other cleaners available for specific requirements.

LEGGE SAFETY FLOOR POLISHES

LECO: For linoleum, rubber, asphalt tile, cork, linotile and similar resilient floors. Gives high slip-resistant finish despite attractive gloss. Protects floors with durable film. A water-emulsion polish.

LEGSURE: For floors similar to those polished with LECO. A self-polishing scuff-resistant, lustrous Safety Polish.

SAFCO: For asphalt tile floors. A water-emulsion polish with higher slip-resistance for harder surfaces. Apply either LECO or SAFCO with a mop.

TRAFLECO (or TRAFCO): For wood, cork, linoleum floors. A solvent, tough-wearing polish, ideal for heavily trafficked floors. Slip-resistant.

Other Safety polishes available for specific requirements.

***All Legge polishes are listed by Re-examination Service of Underwriters' Laboratories.**

LEGGE FLOOR SEALS

Seal your floors against dirt and deterioration with these Legge Products:

CEMENT SEAL: A penetrant that prevents dusting.

TERRAZZO SEAL: Brings out true coloring of terrazzo and other hard-surfaced floors.

WOOD SEAL: A durable seal and surfacer for fine wood and gymnasium floors.

SUPERIOR FINISH: A heavy-duty surfacer for wood and other floors.



MAINTENANCE PRODUCTS

GRIPTEX: A slip-resistant powder sprinkled on floors made slippery by temporary wet or oily conditions.

GUMROK: An abrasive plastic-like coating applied at all slip hazard points. Bites through spillage of oil, grease, water. In red, brown, black, green.

DAMP SWEEP TOOL: The first implement especially made for damp sweeping. Fastened double swivel gives complete maneuverability. Makes it easy to sweep under chairs, desks, other objects. Removes dust completely.

CLOCLAMP: A lightweight one-piece device for easy damp sweeping. Fits over your present broom handle, holding cloth in place.

LEGGE CONDUCTIVE PRODUCTS

Guard against fire and explosion caused by Static Electricity. These Safety Products protect lives and preserve property.

ELIMSTAT: A low-cost conductive finish that is easily painted on floors. Creates safe conductivity by dispersing static electricity.

CONDUCOTE: A heavy-duty conductive coating. Spark-proof.

NoSTAT: A grounding device that protects personnel against static charges. Clamped on sole of shoe.

BOOTIE: Worn comfortably over any shoe, drains static to conductive floor, protecting personnel from discomfort of shock.

SAFESTAT: A grounding device attached to equipment or machinery. 7" x 7" metal plate never loses contact even if moved or kicked.

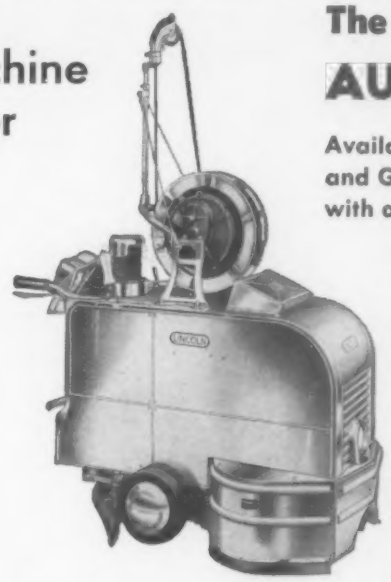
Branch offices in principal cities. Write today for full information and Free booklet.

LINCOLN-SCHLUETER FLOOR MACHINERY COMPANY

COMPLETE LOW-COST FLOOR MAINTENANCE
and Refinishing Made Easy With These Sturdy, Efficient, Time-Saving Machines

There is a **LINCOLN** Machine Designed Especially for Your Floor Area and Material.

Available thru our Factory Trained Representative in Your Territory. . . .



The New 1-Man Lincoln AUTO SCRUBBER

Available in Electrically Operated and Gas-Engine Generator Models with a Wide Range of Brush Spans.

Get Full Details on: 18"—24"—30"—37" and 60" brush span models of Lincoln Auto Scrubber, the miracle machine that will cut your floor maintenance costs to an all-time low! Write for circular AS.

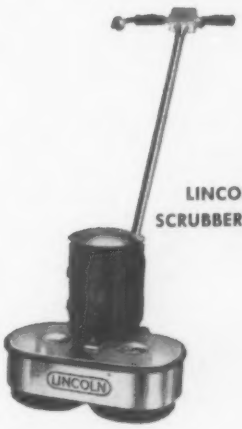
LINCOLN AUTO SCRUBBER

One man and a Lincoln Auto scrubber will scrub and vacuum up to 400 sq. ft. per minute. The ideal floor machine for large corridors and floor areas. Has eight simultaneous automatic operations that cut cleaning time to the lowest possible minimum.



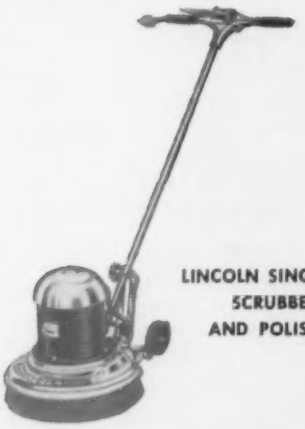
LINCOLN SINGLE DISC RUG AND FLOOR SCRUBBERS

Single disc machines with solution tanks on handles for easy efficient use of shampoo or detergent. Aluminum backed, split-feed brushes for shampooing rugs or scrubbing floors. A change of brushes makes it a polisher also. Five models: 212, 214, 216, 219 and 221. Write for circular RS.



LINCOLN TWIN DISC SCRUBBERS AND POLISHERS

Easy to guide. Ideal for smaller schools where operators are usually past middle age. Available in two sizes: Model 132 with a brush spread of 16 inches and Model N-121 with 21-inch span. Write for circular TD.



LINCOLN SINGLE DISC SCRUBBERS AND POLISHERS

These famous heavy duty scrubbers and polishers come in 5 sizes according to brush spreads: 12", 14", 16", 19" and 21". Finely balanced for easy control, quiet. Handle adjustable to height of operator. Write for circular SD.

***REPRESENTATIVES IN ALL PRINCIPAL CITIES* — WRITE FOR COMPLETE INFORMATION AND NAME OF NEAREST FACTORY DEALER**



Lincoln-Schlueter
FLOOR MACHINERY COMPANY
1234 WEST VAN BUREN ST., CHICAGO 7 ILLINOIS

MORE THAN 50 YEARS OF SERVICE

World's Manufacturer of the Most Complete Line of Floor Maintenance Equipment

MULTI-CLEAN PRODUCTS, INC.

2277 Ford Parkway, Dept. AS, St. Paul 1, Minn.

Floor Maintenance Equipment and Materials

MULTI-CLEAN Method



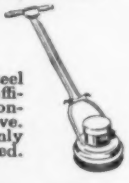
SCRUBBING MACHINE—For floors, rugs and carpets. Heavy gauge steel tank, easily filled, non-spilling. Fingertip solution flow and dual-purpose safety switch. Balanced construction, adjustable handle. 8 ball bearing gear unit. Capacitor motor with sealed bearings, no brushes. 3-conductor cord. Sizes: 12″, 14″, 16″, 19″ and 22″. Attachments for every floor maintenance job.



FLOOR MACHINE—For every type floor work . . . scrubbing, waxing, polishing, troweling, grinding, dry cleaning. Same balanced construction and features as Scrubbing Machine. Quickly converted to scrubbing machine by attaching solution tank and control lever. Five models: 12″, 14″, 16″, 19″, 22″.



EXPLOSION-PROOF FLOOR MACHINE—For mechanical floor maintenance in hazardous areas without danger of fire or explosion. Can be used near and in combustible material with absolute safety. All electrical components are approved by U/L. Brush sizes: 14″ and 16″. Heavy-duty switch and 40 ft. Neoprene-covered 3-conductor cord.



LITE-12 FLOOR MACHINE—Scrubs, waxes, polishes, steel wools all types of floors. Low, balanced construction, efficient, rugged. Finger-tip lever-operated momentary contact type switch. Direct ball bearing greaseless gear drive. ½ hp AC motor, 30′ cord. Brush diameter 12″. Weighs only 38 lbs. with brush. Easy on-off attachments, U/L approved.



INDUSTRIAL VACUUM CLEANERS—MCV-214 and MCV-220, 10 and 16-gal. capacities. Wet or dry pickup. Heavy-duty, portable, quiet, safe, versatile. 1 hp Universal motor, independent cooling system, electronic shutoff prevents flooding, 3-stage turbine, water lift minimum 64″. 30′ 3-conductor cable, 2 hp switch, 10′ 1½″ easy-flex white hose, molded rubber ends. 54″ wand. Standard attachments for floors and upholstery. Also available in extra quiet hospital models.



MCV-255 INDUSTRIAL VACUUM— For big cleaning jobs. 50-gal. capacity. Minimum water lift 80″. 1½ hp Universal motor, independent cooling. Electronic shutoff prevents flooding. 30′ 3-conductor cord. 3-wheel rubber-tired dolly. 54″ wand, 15′ 1½″ flexible hose. Wet or dry pickup. Standard attachments: 18″ floor tool, shoe plate, and 5″ upholstery tool.



D-100 VACUUM CLEANER—Wet or dry pickup, powerful, portable. Weighs only 29 lbs. Maximum 66″ water lift. Long-life precision ball bearings. ½ hp Universal motor. Suction created by 2-stage turbine. Overflow safety fuse. Tank capacity 3½ gals. wet or ½ bushel dry material. Full line of attachments.



F-300 VAC-BLOWER—All-purpose industrial vacuum cleaner and a powerful blower. 16 lb. detachable power head and dust bag for portable blowing or vacuuming. 10-gal. steel tank, 1 hp. AC-DC motor. 43″ maximum water lift. Complete unit weighs only 50 lbs. Easily portable, wet or dry pickup. Attachments for every cleaning job.



ADD-A-TANK—Adapts industrial vacuum cleaner for heavy volume pickup. Fits any 30-gal. or smaller ash-can. For cleaning boiler flues, fire boxes, chimneys, milling machinery, grain elevator pits, all hazardous areas.



E-200 VACUUM CLEANER—Medium priced all-purpose industrial vacuum cleaner. ⅝ hp. AC-DC 115V motor with long-life precision ball bearings. Suction created by 2-stage turbine. 45″ maximum water lift. Tank capacity 10 gals. wet, 1¼ bushels dry. Highly portable. Weighs 48 lbs. Attachments for every cleaning job.

HOW TO SELECT THE MACHINE TO FIT YOUR FLOOR AREA

For economy and efficiency, here is a guide to selecting the proper size floor machine with respect to area.



Floor Area	Floor Area	Floor Area	Floor Area	Floor Area
750 to 2,000 sq. ft.	2,000 to 5,000 sq. ft.	5,000 to 10,000 sq. ft.	10,000 to 20,000 sq. ft.	20,000 and over

MULTI-CLEAN TESTED AND PROVED FLOOR FINISHES

WATERPROOF WAX—Provides lasting beauty, longer wear for all types of floors. Excellent anti-slip qualities. U/L approved. Carnauba base, self-polishing, water emulsion wax. Resists scuffing, won't crack, chip, flake, water-spot or discolor. Also available with special anti-slip formula.

LIQUID SPIRIT WAX—For sealed surfaces. Cleans and waxes in one operation. Combination of vegetable and mineral waxes reinforced with special resins. Produces hard, flexible, easily cleaned surface. Adds life and lustre to all floors except asphalt and rubber. Choice of maroon, tile red, brown, green, gray, natural and colorless.

SUPER SAFETY CLEANER — With HCP (high cleaning power). Lifts stubborn dirt and grime off floors quickly, holds it in suspension for easy removal. Has coconut oil base. Safe for all floors. Cleans perfectly in hardest water. Contains minimum soap solids of 26 %. Goes twice as far as ordinary cleaners. Can be mixed to remove wax.

WAX REMOVER—Safe for all floors. Cleans floor and removes wax buildups. Odorless, non-toxic, non-inflammable. Easy, quick, inexpensive to use. Contains



powerful emulsifying agent that works in 10 to 15 minutes.

BLUE BLAZES CLEANER—Concentrated synthetic cleaner for all floors. Cleans completely in hard or soft, hot or cold water. Cleans quickly, efficiently with a minimum of scrubbing.

REMOVOIL—A Solvent Cleaner and Degreaser. Makes oil-soaked floors look like new. Non-explosive, non-toxic. Removes rubber burns from gym floors. Degreases all kinds of metal and alloys. Protects against rust and corrosion. Easy to use, highly concentrated.

SEAL AND VARNISH STRIPPER—Removes finish from wood, concrete or terrazzo. Easy to apply, requires no after-wash. Non-inflammable. Lifts old finish in 30 to 40 minutes. Won't raise grain in wood or harm basic floor materials.

CONCRETE HARDENER AND ETCHER—Cleans, etches, hardens, dustproofs. Assures even etching on all concrete surfaces to be sealed. Gives longer life, extra strength to floors.

NEO-DRY CONCRETE SEALER—(Rubber Base). Beautifully colors concrete floor surfaces. Fast-drying, easy to apply, prevents dusting and chipping. Highly resistant to alkali and other corrosive agents. Colors: tile red, brown, gray, light gray, green, white, black, natural.

CONCRETE PRESERVER—(Bakelite Base). Provides tough, sanitary, colorful finish and longer life to new or old concrete. Prevents dusting. High resistance to abrasion, water, grease, oils, alkali and soap. Especially recommended where petroleum spillage occurs. Colors: maroon, tile red, brown, green, gray, light gray, natural.

ASPHALT TILE PRESERVER—Penetrates and seals in one application. Preserves beauty of new tile, revives color and finish on old, faded floors. Resists grease, water, soaps, alkalies. Ready for traffic in 20 minutes. Anti-slip material U/L approved.

SUPER FLOR-TREAT—Protects and seals all types of floors. Dries to a tough, good-looking finish in less than an hour. Recommended for light, colored or white asphalt tile. Will not yellow the floor.

TERRAZZO SEALER—One-cost application brings out natural beauty and vivid terrazzo colors. Long-lasting. Seals the pores, prevents chipping and corrosion. Resists water, acids, alkalies, soaps, grease and solvents. Anti-slip U/L tested and approved.

FLOOR DRESSING — with active germicide. Cleans, polishes, disinfects all types of floors. May be used on all wood, terrazzo and concrete floors, on waxed or treated linoleum, asphalt or rubber tile.

PENETRATING SEALER—Polymerized for greater penetration and thorough sub-surface sealing of all wood floors. Protects against wear, moisture, dirt. Stands up in heavy traffic. Lowers floor maintenance costs. Approved by U/L and Maple Flooring Manufacturers Association.

GYM FINISH—Provides hard, durable, easily cleaned high gloss surface, impervious to rubber burns. Assures fast, non-slippery footing. Meets specifications of Maple Flooring Mfrs. Ass'n and approved by U/L.

HUNTINGTON LABORATORIES

Huntington, Indiana



Howard Elementary School, Grand Island, Nebraska

Give Children the Protection of these HUNTINGTON Products in Schools, Hospitals, Churches

Modern teaching methods . . . group activities . . . therapeutic training . . . often require that children sit or lie on the floor. It can be wholesome and healthful if those floors are warm *and clean.*

New heating systems provide the warmth and eliminate drafts, but only you, with regular, thorough maintenance, can be sure the floors are as clean as they ought to be. Cleaning products have progressed with the times. We have the cleaners and waxes necessary to keep your floors clean, attractive and safe . . . and our "know how" in maintenance methods can be yours for the asking. If your cleaning program needs to be modernized to fit your teaching methods, write us for help.

NATIONAL VULCANIZED FIBRE CO.

Wilmington 99, Delaware



a school wastebasket that's guaranteed for five years

Because handsomely rugged Vul-Cots are expertly made from National's Vulcanized Fibre, they offer economy-minded school-men an unusual combination of highly desirable qualities which include—

STRENGTH

Vul-Cots are strong, tough and durable. Capable of absorbing the hardest kind of schoolroom use or abuse. Their attractive, smooth surfaces resist wear and never splinter, dent, rust or corrode. With normal use they serve a lifetime.

APPEARANCE

Vul-Cots are available in 5 attractive efficient styles in a choice of sizes. There's a famous Vul-Cot for every school use—classroom, library, office, cafeteria, auditorium, or gymnasium. The exclusive double rolled top holds its round, smooth shape for the life of the basket. Attractive colors are a permanent part of the fibre; they can't chip, mar, stain clothing or rub off.

ECONOMY

A Vul-Cot wastebasket defies wear. It will remain attractive for years of long hard service. *Your first Vul-Cot cost is your last*—this is the secret of Vul-Cot economy.



Write for Bulletin 54. It's full of ideas about dozens of materials handling receptacles that are ideal for school use.

ROUND TAPER Popular for office and classroom. Large in capacity, occupies small space.	Top Dia.:	No. 1 10″	No. 2 12″	No. 3 14″
	Bottom Dia.:	8″	10″	12″
	Depth:	12″	14″	16″
SQUARE TOP Same as No. 2 above but with square top. Fits corner or against wall.	Top:	No. 2-A 10½″ x 10½″		
	Bottom Dia.:	10″		
	Depth:	14″		
SQUARE TAPER A distinctive style, popular with executives. Ideal for reception or board rooms.	Top:	No. 5 12″ x 12″		
	Bottom:	10″ x 10″		
	Depth:	15″		
RECTANGULAR Large capacity, yet takes up small space. Nestles against desk or wall.	Top:	No. 5-A Length 15½″ Width 9¼″		
	Bottom:	Length 14″ Width 7″		
	Depth:	15″		
ROUND STRAIGHT Specially designed for washrooms, cafeterias, libraries, laboratories.		No. 9	No. 10	
	Diameter:	14″	14″	
	Depth:	20″	30″	

NATIONAL
VULCANIZED FIBRE CO.
WILMINGTON 99, DELAWARE

THE SPENCER TURBINE COMPANY

Hartford 6, Connecticut



VACUUM CLEANING—ADVANTAGES

Educators, architects and engineers agree that vacuum is the only way to properly clean a school. Spencer Vacuum has been the accepted standard in all types of buildings *for many years* and is installed in thousands of schools.

For perfect sanitation, there is no method that will pick up more dust and dirt, and at the same time, require less of the janitor's time. For instance, one janitor can easily clean twelve classrooms in two hours. It is equally efficient for wood, tile, linoleum or cement floors. Less frequent waxing is required for polished floors. Rugs, carpets, furniture and decorations last longer.

VACUSLOT



Vacuum slots placed on all floors, connected to a stationary vacuum producer in the basement. Dry mops, hand brushes, and dust rags are cleaned by passing over the slots. Other methods include cabinets, and attachments for both the Spencer Portable and Stationary Vacuum Cleaning Units.

WATER PICK-UP

Vacuum will pick up liquids. By placing a wet separator tank between the vacuum tool and the inlet valve, all the liquid can be collected without entering the vacuum system. These tanks have a capacity from 8 to 100 gallons. Special tank attachments also available for Spencer portables.



Spencer Central Vacuum Cleaning is a permanently installed system and consists of five essential parts, each carefully selected to meet the special requirements for each individual building:

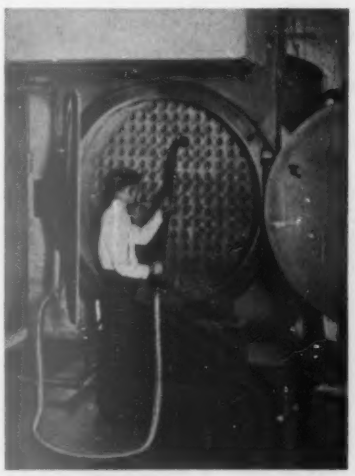
1. A vacuum producer, located in the basement.
2. Inlet valves, conveniently located on all floors and piped to vacuum producer.
3. Specially designed, entirely enclosed, and easily cleaned separator.
4. Light weight, flexible hose.
5. Special vacuum tools for each operation.

Ask for Bulletin No. 138-C on Spencer Mop-Vac and Bulletin No. 133 on Stationary Vacuum Cleaning Systems.

SWIMMING POOL CLEANING EQUIPMENT:

By means of special cleaning tools usually employed in connection with the pump on the filtering system, it is possible to remove accumulated sediment from swimming pools without the waste of water involved in draining the pool. Bulletin No. 139.

BOILER TUBES CLEANED



Spencer Vacuum keeps boilers working at top efficiency by cleaning soot out of boiler tubes, in this way often saving the cost of the entire installation within a few years. Spencer Vacuum also keeps boiler room floors clean, and easily removes soot and dust from overhead pipes. Bulletin No. 137.

SPENCER VACUUM TOOLS:

Special Spencer tools have been developed for the above and many other purposes. Connections to the vacuum hose are made through light weight aluminum handles and special Spencer elbow joints which have a swivel hose connection. This allows the hose to hang freely, away from the body of the operator. A shut-off valve conserves power when the vacuum tool is not in use. Bulletin No. 115.

PORTABLE VACUUM CLEANERS

Spencer Portables built on the same principles of design and using the same vacuum tools are available in sizes from ½ HP up. The 1 HP unit illustrated is used extensively in schools. It has a large capacity dirt can which may be dropped to the floor by pressing the foot cam, and then rolled on its own casters to any point. Large bag area is cleaned by shaking without removing. Machine on large wheels, turns easily in small space. Ask for Bulletin No. 114-D.



UNITED FLOOR MACHINE COMPANY, INC.

7723 South Chicago Avenue • Chicago 19, Illinois

Maintain Your Floors Better, At Lower Cost, With UNICO Equipment

Models For Every Floor and Carpet Maintenance Need

Simple Tank Attachment Quickly Converts To Wet Scrubber →



Unequalled For Scrubbing, Waxing, Polishing, Sanding, Buffing, Steelwooling

•

AVAILABLE IN 12", 13", 15",17" and 20" BRUSH SIZES

UNICO Floor Machines are unsurpassed in value and performance, precision engineered for top efficiency, fully guaranteed. Proven best for scrubbing all types of floors sparkling clean. Quickly converted to wet scrubbers for shampooing rugs and carpets right on the floor. In addition, brushes and other attachments can be interchanged for waxing, polishing, sanding, buffing, grinding, steelwooling. Reversible safety control switch, adjustable handle, ball-bearing wheels, retractable wheel carriage, non-marking rubber bumper, G. E. motor, and other features make Unico your best floor machine buy!

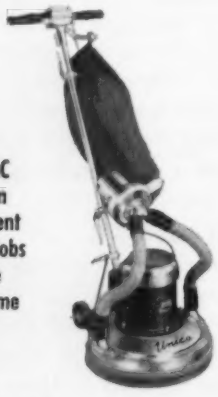


Model S-12B Aero For Smaller Floor Areas

Small in size, mighty in performance, low in cost, easy to operate. Specially designed for maintenance of smaller floor areas. Weighs only 42 pounds, easy to carry. Features new Uni-Drive; no gears, no grease, no noise. 12" brush size. Quickly converts from polisher to wet scrubber. With attachments, it also waxes, sands, buffs, steelwools, polishes, etc.

Unico's Powerful, Efficient Vacuum Equipment Simplifies Wet and Dry Pickup

DRY-VAC Vacuum Attachment Does 2 Jobs At the Same Time



DRY-VAC—Vacuum attachment for Unico machines vacuums dust and dirt and polishes floors in a single operation. Picks up all fine steelwool particles during steelwooling. No dust during disc sanding.



Model UVI-901BP—UNI-VAC portable vacuum for wet and dry pickup. No mops, no pails, no wringers. Capacity, 10 gal. liquid, or 1¾ bushels refuse. 1 H.P. silent motor. Can be used for blowing.



Model UVM-902—UNI-VAC portable vacuum for heavy duty industrial use. Ideal for cleaning boilers, furnaces, etc. Built-in cord reel. Outside dust bag. Powerful 1¼ H.P. motor.



Model UVI-903—UNI-VAC super-heavy-duty, super-quiet portable vacuum for wet and dry operations. Built-in cord reel. Capacity, 12 gal. liquid, or 2 bushels dry refuse. 1¼ H.P. silent motor.

WRITE FOR DETAILS . . . ASK FOR FREE DEMONSTRATION ON YOUR OWN FLOORS

ANCHOR POST FENCE DIVISION

ANCHOR POST PRODUCTS, INC.

Complete Line of Fences and Gates

6695 Eastern Ave., Baltimore 24, Md.

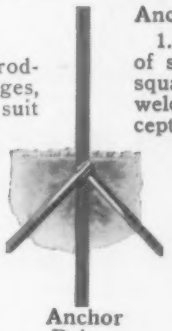
SALES OFFICES IN PRINCIPAL CITIES

ANCHOR FENCES FOR SCHOOLS AND SCHOOL PLAYGROUNDS

The Anchor Post Fence Division of Anchor Post Products, Inc., has been serving public schools and colleges, municipalities and industrial plants with fencing to suit their various requirements for over half a century.

Anchor Chain Link Fences

Makers of America's first chain link fence, the Anchor Post Fence Division today manufactures a complete line, and will be glad to supply any interested school executive or architect with a copy of our Chain Link Fence Catalog containing full information about the four exclusive features which make an Anchor Chain Link Fence exceptionally attractive and durable. **Ask for Catalog No. 120.**



Anchor Drive-Anchorage

Note: While we strongly advocate the drive-anchor method of setting posts, we can, if desired, set our posts in concrete footings when conditions warrant such a procedure.

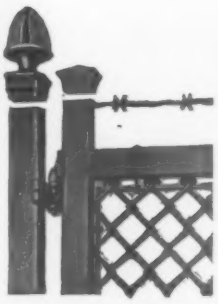
Anchor's Four Features

1. ANCHOR-WELD WIRE GATE—built with a frame of square tubular steel—arc-welded at the corners. The square shape of the heavy steel tubing, together with the welding of the corners, provides a framework of such exceptional strength that no re-enforcing diagonal braces are needed. We claim that this is the strongest and most attractive wire gate made.

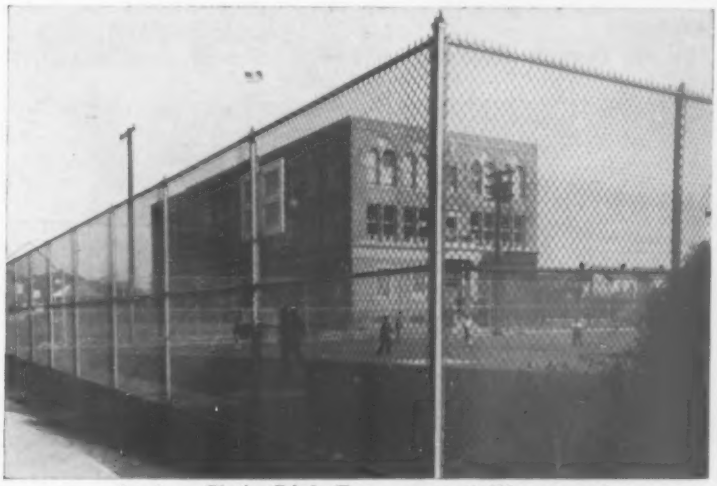
2. SQUARE TERMINAL POSTS—stronger because they are square in section. More protective—having no fabric-holding bands and therefore providing no footholds for climbing. Better-looking—because of their graceful lines.

3. LINE POSTS—choice of H-Beam or Pipe.

4. DRIVE-ANCHORAGE—grips the soil like the roots of a tree. We have imitated nature's engineering by providing the line posts with a broad foundation. Anchor drive-anchors defy thaws, frosts and the many other strains to which a fence is subjected.



Anchor-Weld Wire Gate



Anchor Chain Link Fence around Playground



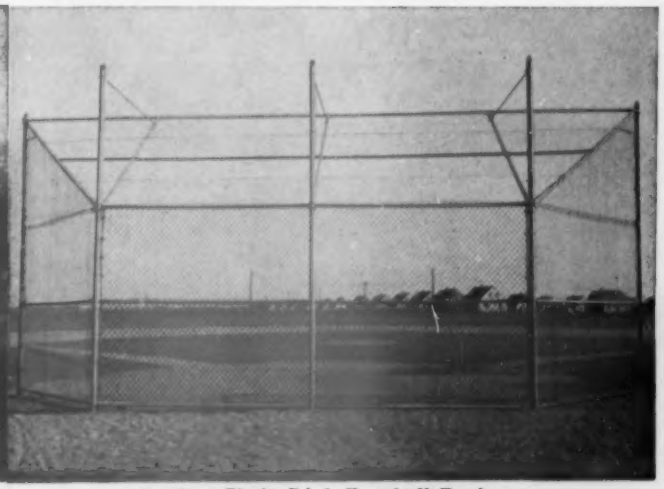
Anchor H-Beam Line Post



Anchor Square Terminal Post



Anchor Chain Link Tennis Court Enclosure



Anchor Chain Link Baseball Backstop

THE COLORADO FUEL AND IRON CORP.

Continental Oil Building, Denver 2, Colorado
AND SUBSIDIARIES

Wickwire Spencer Steel Division
361 Delaware Avenue
Buffalo 2, N. Y.

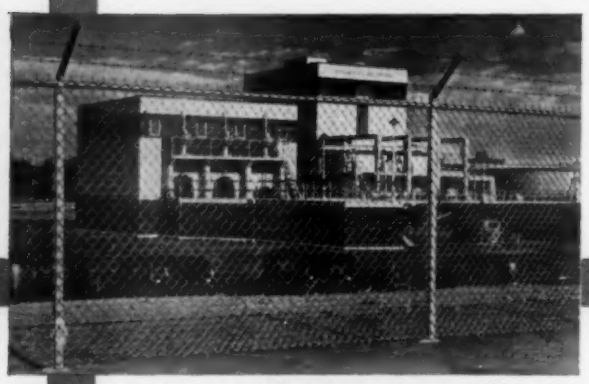
Pacific Coast Division
1080 19th Avenue
Oakland 6, Calif.

BRANCHES AND ERECTORS IN KEY CITIES EVERYWHERE

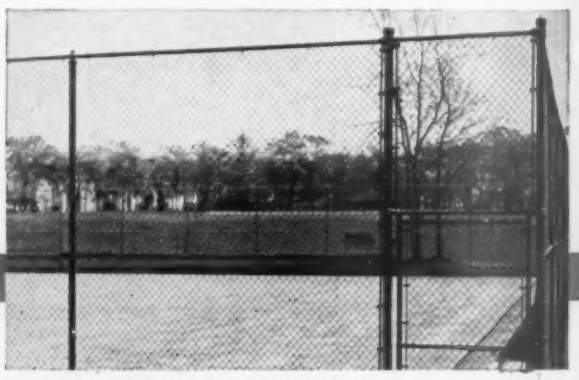
REALOCK FENCE

Realock Fence assures real locked-in protection for your grounds and buildings, because bolts on all fittings, hinges and locking devices are removable only from the inside — safely secure from outside tampering. Realock Fence is also available for enclosing playgrounds, tennis courts and athletic fields.

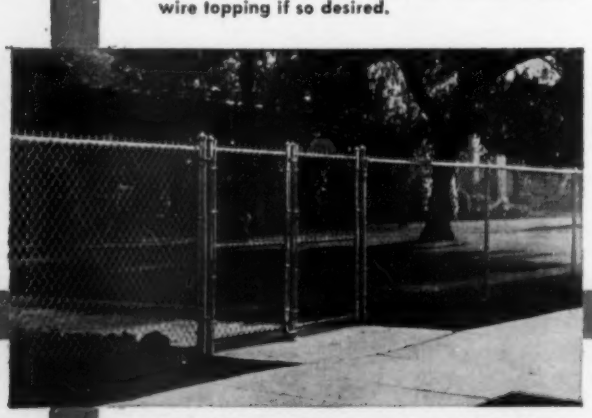
Noted for its rugged construction and long-lasting weather resistance, Realock Fence can be depended upon for years of low-cost, trouble-free service. Supplied in standard heights up to and including 12 feet. Furnished with barbed or knuckled selvage; with or without barbed wire topping. Expert erection service conveniently available. Write our nearest sales office or consult your classified telephone directory.



TYPE 423-H Realock Fence, 8 feet high, using "H" section posts. Topped with three strands of barbed wire. Five and six strand barbed wire topping if so desired.



REALOCK TENNIS COURT ENCLOSURE. Illustration shows a typical Realock Tennis Court Fence design. Two types are available — 310 (Light construction) and, shown here, 420 (Heavy construction). Standard heights, 8′, 10′ and 12′.



TYPE 320 Realock Fence, five feet high with tubular post construction and barbed selvage, top and bottom. This fence can also be supplied with knuckled selvage top and bottom.



TYPE 420 Realock Fence, 7 feet high with barbed selvage at top. This view shows the sturdy, tubular end-post construction — assurance of long-lasting strength and minimum maintenance for years to come.

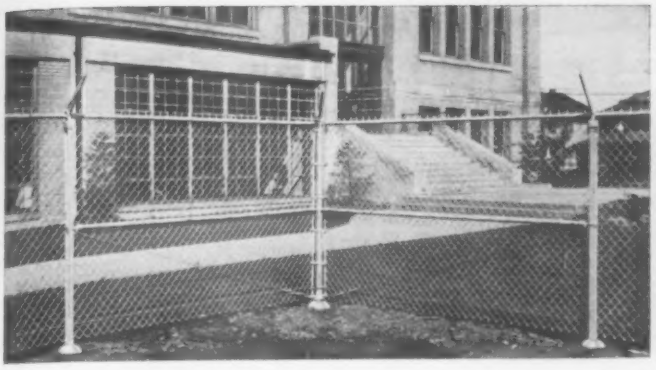
CONTINENTAL STEEL CORPORATION

Manufacturers of Chain Link Fence for All Purposes

"SALES REPRESENTATIVES IN PRINCIPAL CITIES"

*

CONTINENTAL *Chain Link* FENCE





COMPLETE CHAIN LINK FENCE

To meet the fencing requirements of schools and universities, Continental has developed a wide range of structural variations in its Chain Link Fence. The selection in styles, heights, types of top construction, gates and accessories makes it possible for schoolmen to select the best fence for any installation.

MADE OF KONIK STEEL

FABRIC OF KONIK STEEL

The wire fabric in Continental Chain Link Fence is made of KONIK—a new steel containing copper, nickel and chromium for greater strength and rust resistance "clear through." This superior fence fabric carries a zinc coating applied by a special hot dip process to insure uniformity and adhesion of the coating to the base steel. A uniform, bright finish enhances the appearance of Continental fence fabric. Wire is full gauge and woven in exact mesh.

TAILORED TO FIT SCHOOL PROPERTY

Experienced fence engineers plan and help erect Continental Chain Link fence anywhere. No matter what your property protection problem, Continental engineers will work with you in laying out the most effective and economical installation—planned to harmonize with the character of school property, and provide the type of protection you want.

10 STYLES

Continental offers 10 styles of top construction for Chain Link Fence. Six popular styles are illustrated to the right. Continental fence is engineered for each specific job.

POSTS AND FITTINGS

Continental fence has heavier, sturdier posts with improved brace construction. Top rails are joined by a special Inside-Outside coupling. Post caps and barbed wire arms are sturdy, heavier. Self-locking slots hold barb wire. New type lock pin eliminates bolts and nuts for fastening fabric to tension bands.

GATES

Strong and easily operated gates and locking devices. Single and double types with improved pivot type hinges. Manually or mechanically operated.

ENGINEERING AND ERECTION SERVICE

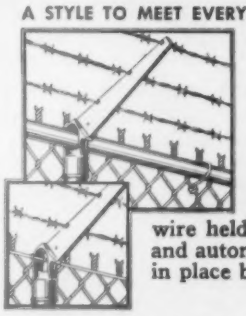
Our engineers are prepared to assist you in laying out the most economical installation for your purposes. Trained erection crews are available for correct and economical construction anywhere. When local labor is used Continental will supply competent foreman and inspection service.

SEND FOR FREE MANUAL

This file size book contains more than 100 illustrations, will help you evaluate fence protection, select right style of fence. Write the



A STYLE TO MEET EVERY SCHOOL NEED



Style 3B-R—Three strands of barb wire with top rail. Arm of 12 gauge pressed steel. Barb wire held in angle slots and automatically locked in place by tension.

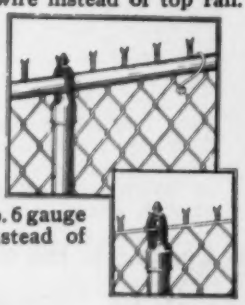
Style 3B-W Same with No. 6 gauge coil spring tension wire instead of top rail.

Style 5B-R— Five strands of barb wire with top rail. Top rail of tubular steel 1⅝" O. D. Has 7" expansion sleeves.



Style 5B-W—Same with No. 6 gauge tension wire instead of top rail.

Style NB-R— No barb wire with top rail. Style NB-W



—Same with No. 6 gauge tension wire instead of top rail.

* Trade Mark Reg. U. S. Pat. Off.

CONTINENTAL STEEL

CONTINENTAL STEEL CORPORATION

GENERAL OFFICES - KOKOMO, INDIANA

General Offices: Kokomo, Indiana

CYCLONE FENCE DEPARTMENT

AMERICAN STEEL & WIRE DIVISION, UNITED STATES STEEL CORPORATION

UNITED STATES STEEL

General Offices: Waukegan, Illinois

Waukegan, Ill. — Newark, N. J. — Oakland, Calif. — Greensburg, Ind. — Fort Worth, Texas — DeKalb, Ill.

United States Steel Export Company, New York

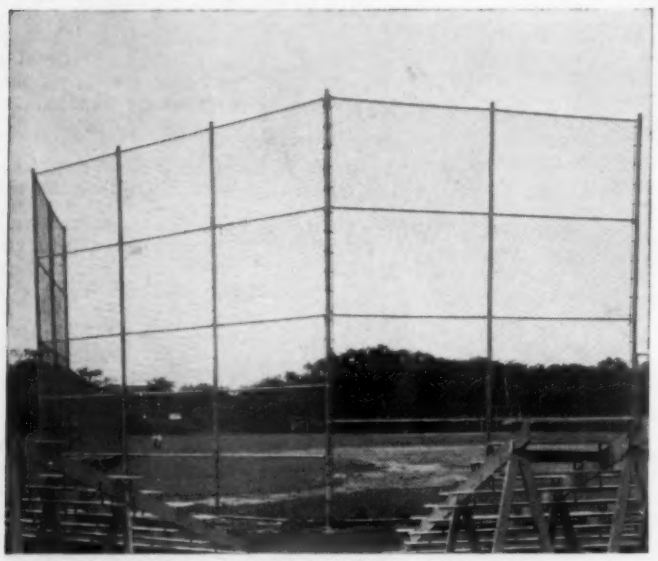
FOR enclosing school yards, playgrounds, athletic fields, outdoor pools—Cyclone Chain Link Fence provides the utmost in protection for children, property and equipment. And it's not surprising, because Cyclone has long specialized in fencing school property.

In the long run, Cyclone is most economical, too. It is strongly constructed of special steel fabric—galvanized after weaving for complete weather resistance. It embodies many special features of design and construction. Installation is made by Cyclone's factory-trained experts. The result: a Cyclone Fence stays taut and true . . . gives long, trouble-free service.

For athletic fields, for stadiums—wherever paid admissions are a factor—a Cyclone Fence provides effective "entrance control" . . . makes gate receipts go up, and ticket collecting easy.



Cyclone "Safeguard" Chain Link Fence for schools, playgrounds, parks, institutions, etc. For fencing school property, Cyclone recommends six-gauge wire because of its greater strength.



Cyclone Backstops can be furnished in standard specifications or made to your special requirements.

Cyclone Tennis Court Enclosures are "standard equipment" for many of the finest tennis clubs.



SEND FOR OUR FREE ILLUSTRATED BOOK — "Your Fence — How To Choose It — How To Use It." Its 32 pages are packed with interesting, helpful information. Also available is a folder giving detailed specifications for Cyclone Fence and other wire products used for school properties. And for help in making cost estimates — our sales engineers are at your service. There is no obligation incurred.

Cyclone is the trade-mark name of fence made only by Cyclone Fence. Accept no substitute.

NO JOB IS TOO LARGE

—NO JOB IS TOO SMALL FOR CYCLONE

NORTH AMERICAN IRON & STEEL CO., INC.

103 58th Street, Brooklyn, N. Y.

NAISCO — FLAGPOLES — RAILING — NAISCO

FLAGPOLES

NAISCO Flagpoles are manufactured in Steel, Aluminum, Stainless Steel and Bronze.

The greatest variety of mountings is available including Ground Set, Tilting, Wall Mounted, and Roof Set.

Flagpoles can be fabricated with the classical Entasis Tapering, Cone Tapering or Swaged Telescoped Tapering.

Ornamental Bases and Accessories are available in a wide range of design.



FLAGPOLES

RAILING



STRUCTURAL ORNAMENTAL RAILING



ORNAMENTAL SLIDING GATES

North American Railings have been furnished for projects varying in size from the smallest school building to road projects including the New York and New England Thruways, New Jersey Turnpike, and Baltimore-Washington Expressway.

Ornamental or Structural Railing to any design is a specialty.

Experience, dating from 1913, is at the disposal of architect and engineer.

Requests for design data and information will be promptly accommodated.

THE STEWART IRON WORKS COMPANY

"Fence Builders to America Since 1886" INCORPORATED

2203 Stewart Block, Cincinnati 1, Ohio

PRODUCTS

Bronze Tablets
Chain Link Wire Fence and Gates
Flag Poles
Folding Gates



PRODUCTS

Iron Fence and Gates
Pipe Railing
Settees
Stadium Seat Brackets
Window Guards
Wire Mesh Partitions

FOR EVERY PURPOSE

Stewart offers Plain or Ornamental Iron and Chain Link Wire Fence and Gates for front, side and rear property lines; for athletic fields, tennis courts, recreation grounds and other school requirements.

Stewart Chain Link Wire Fence is the only ALL BEAM FRAMEWORK construction on the market. The Chain Link Wire Fence illustrations clearly show this exclusive feature. Notice the 3TH Oval-Back I-Beam Line Post with integral extension arm. Obviously this solid post is superior to pipe or other types of post requiring a separate pressed steel arm which may be removed or easily broken. Notice, too, that the beam top rail passes through the post itself — eliminating the need for fittings. The flat, smooth surfaces of Stewart All Beam construction offer maximum resistance to wear, weather and corrosion. This type of fence structure, exclusive with Stewart, is the heaviest and strongest manufactured.



Style OTH Chain Link Wire Fence



Style 3TH

Usual heights of style 3TH shown in illustration are 7 ft. and 8 ft. overall. All materials are of Copper-Bearing Steel hot-dipped galvanized *after* fabrication to assure greatest possible resistance to rust.

CATALOGS — SALES AND ERECTION SERVICE

Literature is available on all Stewart products. If interested in Chain Link Wire Fence ask for Catalog No. 85. If in Iron, ask for Catalog No. 84. When requesting catalogs, please indicate products in which you are primarily interested.

Stewart maintains sales and erection offices in all principal cities. Consult your local classified telephone directory or write direct to factory.



IRON FENCES AND GATES

For front property lines where dignity as well as protection is a requisite, Stewart offers a multiplicity of designs in plain or highly ornate iron. Here again Stewart construction is unique. The patented channel rail, exclusive with Stewart, adds immeasurably to the strength of the fence. All fittings are of Stewart design—the result of 66 years' experience and research in the fence building field.

WIRE PARTITIONS

Effective and economical enclosures for locker rooms, stock rooms, supply rooms, toolrooms, machinery, power houses, etc. When writing for prices please send sketch giving measurements.





BACKSTOPS

Ideal for hard or soft baseball diamonds, tennis and badminton courts, etc. Sturdily constructed to stand the toughest abuse. Literature and prices furnished on request.

BRONZE PLAQUES

Plaques. and tablets of hand-chased cast bronze, are available in stock sizes from 9" x 16" to 24" x 36". Special sizes will be made to order. Literature and prices gladly sent on request.



DEVERE COMPANY

POWER MOWERS

Racine, Wisconsin



DEVERE

The Rotary MOWER Line

with Next Year's DESIGN . . . and the new DEVERE "HUSTLERS"

You'll want DEVEREs because:

1—ROTARY SCYTHE, SUCTION LIFT cutting technique, featured on all DEVERE models, improves cutting grass of any height or density.

2—These are COMPLETE POWER MOWERS, combining all operating advantages needed to meet all kinds of lawn maintenance problems.

3—ADJUSTABLE CUTTING: 1" to 4", easily adjusted.

4—SIMPLE CONSTRUCTION, Mounting and Blades.

5—They COST LESS to buy, less to maintain . . . plus other features you'll like.

Another reason you'll want DEVEREs:

THE LEAF DISPOSAL Mulcher Attachment



Easily attached in a few minutes . . . saves hours of time! Mulches leaves into small particles, blows them out to add rich humus to soil. Eliminates raking and disposal problems.

. . . and the HUSTLERS by DEVERE

A MODEL for every LAWN JOB

Model 31R—31" HEAVY DUTY, with Reverse
Model 31 —31" HEAVY DUTY, self-propelled
Model 24R—24" HEAVY DUTY, with Reverse
Model 24 —24" HEAVY DUTY, self-propelled
Model 22 —22" HEAVY DUTY, self-propelled
Model 420 —20" HEAVY DUTY, self-propelled
Model 20 —20" HEAVY DUTY, hand-propelled
Model 418 —18" Self-propelled Side Trimmer
Model 18 —18" Hand-propelled Side Trimmer

HUSTLER All-Purpose Power Unit Rigs:

Model 165 - 6 HP - 60" to 80" tread (adjustable)
Model 55 - 1½ to 2 HP • Model 10 - 1½ to 2 HP

Write Dept. A for complete Data


DEVERE HUSTLER Model 55


DEVERE HUSTLER Model 165

DEVERE COMPANY
RACINE - WISCONSIN
"Quality since 1922"

THE ECLIPSE LAWN MOWER CO.

Division of Buffalo-Eclipse Corporation

527 Railroad Street, Prophetstown, Illinois

Ask the school that has an Eclipse® MOWER

It's the EASY DOES IT Mower... Easy to start, easy to handle, easy on the budget!

Yes, users agree *easy* is the word for it! Eclipse mowers are precision built to give top performance—not only when new, but through constant use, season after season. They're made to cut efficiently, handle easier, last longer ... with a minimum of maintenance expense. See in the specification charts below the extra value that's put into each Eclipse mower to assure your satisfaction ... for years to come.

REPAIR PARTS ARE ALWAYS AVAILABLE FOR



32" SPEEDWAY with riding sulky

REEL • ROTARY SICKLE BAR TYPES 11 Power and 8 Hand Models



MODEL "L" HAND MOWER



TORNADO SICKLE BAR MOWER



21" PARK-HOUND

FEATURES LIKE THESE MAKE ECLIPSE POWER MOWERS EASY TO USE

Model	Type	Width of Cut	Height of Cut	Engine (4 Cycle B&S) H. P.	Max. R.P.M.	Starter	Cutting Unit	Clutch	Drive	Lubrication	Operating Speed (MPH)	Daily Acreage Capacity	Riding Sulky
Lark	Reel	18"	½"—1½"	1.1	3200	Rope	5 blade, 5 spider reel	Spring action	Diamond Roller Chain	Oil cups	1—3	—	No
Rocket	Reel	20"	¾"—1½"*	1.1	3200	Rope (Lever optional extra)	5 blade, 5 spider reel	Internal expansion	¼" Diamond Roller Chain	Oil cups	1—3	—	No
Rocket Deluxe	Reel	20"	¾"—1½"	1.1	3200	Lever	Elmco-treated 5 blade, 5 spider reel	Internal expansion	¼" Diamond Roller Chain	Oil cups	1—3	—	No
Parkhound	Reel	21"	¾"—1½"	1.6	3200	Lever	5 blade, 5 spider reel	Internal expansion	5/16" Diamond Roller Chain	Zerk fittings	1—3½	2—4	No
Century	Rotary	20"	1"—3"	2	3600	Rope	Hardened steel, replaceable	—	Vertical Shaft	—	—	—	No
Duo-Master	Rotary	17"	1"—1½"—2¼"—3"	1.6	3600	Rope	Hardened Steel Replaceable	—	Vertical Shaft	—	—	—	No
Duo-Master	Rotary	19"	1"—1½"—2¼"—3"	2	3600	Rope	Hardened Steel Replaceable	—	Vertical Shaft	—	—	—	No
Rolloway	Reel	25"	¾"—2½"	2.5	3600	Lever	5 blade reel with 5 double-riveted spiders	Internal expansion	5/16" Diamond Roller Chain	Zerk fittings	1—4	3—5	Optional extra
Speedway	Reel	32"	1"—2½"	5.1	3200	Crank	5 blade reel with 6 double-riveted spiders	Internal expansion	⅜" Diamond Roller Chain	Zerk fittings	5—7	7—15	Optional extra
Tornado	Sickle Bar	36"	¾" or 2"	2	3600	Rope	2 floating sickle knives furnished	Internal expansion	5/16" Diamond Roller Chain	Zerk fittings	1—3	—	No

*Rocket also available in Hi-CUT model, to cut from 1½" to 2½". All Eclipse mowers have fatigue-free, natural-grip handles, finger-tip clutch and throttle controls. All reel type mowers have adjustable reel bearings and are available with automatic sharpeners (optional extra)

HERE'S WHY IT'S SO EASY TO USE ECLIPSE HAND MOWERS

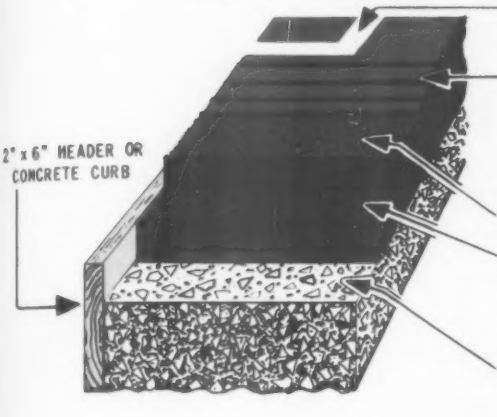
Model	Width of Cut	Height of Cut	Reel	Adjustable Reel Bearings	Cutter Blade Adjustment	Wheels	Built-in Automatic Sharpener	Roller	Roller Bearings	Handle
Eclipse "L" (Std.)	16" or 18"	½"—1½"	5 blade, 4 spider reel, cylindrically ground	Full race ball	Single thumb screw	Rubber-tired	Yes	Rubber-covered	Adjustable	All steel natural grip
Eclipse "L" (Hi-Cut)	16"	1"—2"	5 blade, 4 spider reel, cylindrically ground	Full race ball	Single thumb screw	Rubber-tired	Yes	Rubber-covered	Adjustable	All steel natural grip
Zephyr	16" or 18"	½"—1½"	5 blade, 4 spider reel, cylindrically ground	Full race ball	4 Micro-adjusting screws	Rubber-tired	Yes	Rubber-covered	Adjustable	All steel natural grip
Vogue	16" or 18"	½"—1½"	5 blade, 4 spider reel, cylindrically ground	Full race ball	4 Micro-adjusting screws	Rubber-tired	Yes	Rubber-covered	Adjustable	All steel natural grip
Arlington	16"	½"—1½"	5 blade, 4 spider reel, cylindrically ground	Full race ball	4 Micro-adjusting screws	Rubber-tired	Yes	Seasoned maple	Adjustable	Seasoned maple

Laykold® TENNIS COURTS

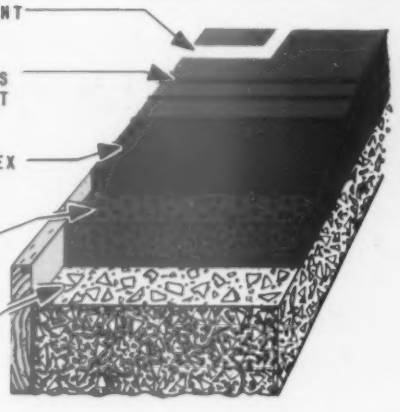
ASPHALT SPECIALTIES

New tennis courts

LAYKOLD COURT - SPECIF G-5

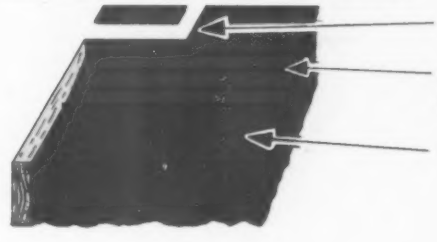


GRASSTEX COURT - SPECIF G-18



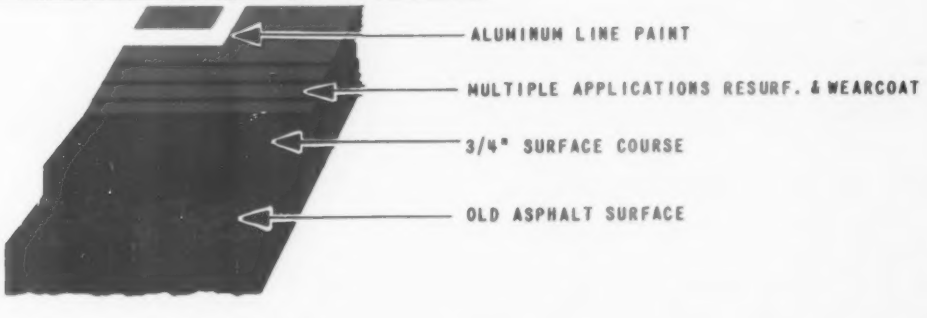
Maintenance of tennis courts

LIGHT WEARING SURFACE - SPECIF G-6

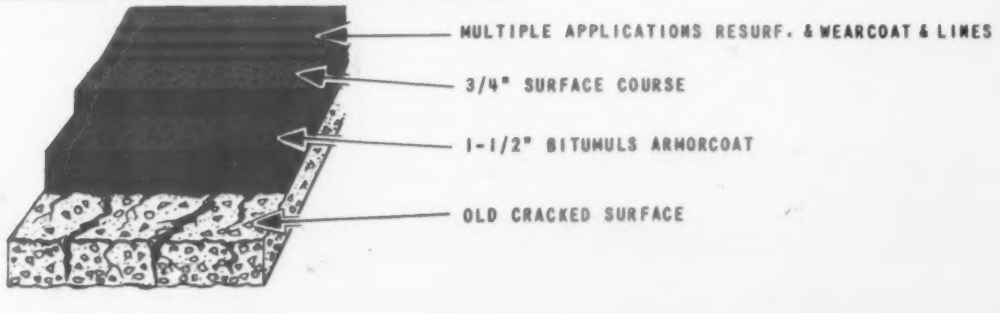


Reconstruction of tennis courts

SURFACING OF UNEVEN BIT. AREA - SPECIF G-8



RECONSTRUCTION OF CRACKED SURFACE - SPEC G-7



AMERICAN
Bitumuls & Asphalt

AMERICAN BITUMULS & ASPHALT COMPANY

200 Bush Street • San Francisco 4, California

E. Providence 14, R. I. • Perth Amboy, N. J. • Baltimore 3, Md. • Columbus 15, Ohio • St. Louis 17, Mo. • Mobile, Ala. • Baton Rouge 2, La.
Tucson, Ariz. • Inglewood, Calif. • Oakland 1, Calif. • Portland 7, Ore. • Seattle, Wash. • Washington 5, D. C. • San Juan 23, P. R.

LONGER LIFE—GREATER RESILIENCE IN

Laykold® and GRASSTEX® Tennis Courts

Preferred by schools and universities throughout the country for their smooth, comfortable surface, durability, attractive appearance and all-weather playability. LAYKOLD® and GRASSTEX® courts are modest in initial cost; require little or no maintenance.

RESURFACING—LAYKOLD Resurfacer and Wear Coat will renew your old courts efficiently and economically, adding years of maintenance-free life.



Courts of a leading Western University.

WALKS, DRIVES, PAVED AREAS

Use economical BITUMULS®—a cold, liquid emulsified asphalt—for all paved areas. Anyone can apply it; no heating required. BITUMULS Walk-Top in black, red or green, is a non-skid, smooth seal for broom or squeegee application on paved areas.

FLOORS

LAYKOLD Floor Mastic Binder—an asphaltic emulsion for mixing with cement and aggregates for underlayment, or wearing course mastics.

LAYKOLD Tile Set—a proven adhesive for holding asphalt tile.

LAYKOLD Step-Grip—non-skid mortar, ready for application over stairs, walks and ramps.

LAYKOLD *Products are applied cold.*

ROOFING

LAYKOLD Fibrecoat—low cost, mineral-armored asphalt of unsurpassed wear—and weather-resistance for cold application on roofs.

Write now for literature on any or all of these products.



GRAVELY TRACTORS, INCORPORATED

Box 52, Dunbar, W. Va.





ONE 5-HP GRAVELY TRACTOR POWERS 21 TOOLS

With manpower scarce and maintenance costs rising, there is only one solution to the maintenance problem—POWER!

With one man and Gravely Equipment you do the same maintenance job that usually takes *eight* men!

Figure the savings yourself! No investment in one-job tools—from mowing to removing snow, the powerful Gravely and its seasonally selected attachments will do your maintenance jobs faster and better—all year long!



Ask about the New Gravely Rotary Mower and Leaf Mulcher Attachment.

NEW... 3 Job Geared Models

With Ground Speeds to Fit Your Job!

Now Gravely gives you three models, job-geared to the maximum speed needed for *your* job!

LS—geared to a ground speed maximum of 2 MPH. Best for heavy duty jobs where power is more important than speed.

LI—geared to a maximum of 3 MPH. Best all-around tractor—geared low for power, but fast enough to turn in a good mowing speed.

LH—the Hi-Speed Tractor, best for fast mowing, jobs where time and production are most important.

REQUEST a demonstration today—now . . . a Gravely for ANY job!

NEW SELF-STARTER OPTIONAL EQUIPMENT



Send for Your FREE Copy of
"POWER vs. DRUDGERY"—the Complete GRAVELY CATALOG

KUT-KWICK CORPORATION

Factory—Brunswick, Ga.

SCYTHE and SICKLE ARE OBSOLETE FOR GROUNDS MAINTENANCE

KUT-KWICK pioneered the Rotary Principle to Eliminate Breakdowns - Get More Work Done - Provide More Versatility in Attachments - Stop Brush Invasion - More Power Without Vibration.



from a user . . .

1. LOW MAINTENANCE COST
   In our cutting operations of the summer of 1953, the only maintenance cost was for two new V-belts which wore out.

2. VERY WELL BALANCED
   This is very important to us as much of our mowing is carried out on banks with as much as a 45° slope

3. SHREDDING ACTION OF ROTARY
   By shredding the vegetation, the Kut-Kwick practically eliminates the need for hand raking and in addition provides a mulching effect returning needed organic matter to the soil.

Signed - William Cowan
Providence Water Supply Board

"A must for all park departments."
Jim Cooper, Superintendent
New Haven, Conn.

4 season operation

6 and 8½ h.p.
WISCONSIN Motors

Operator Can Ride Sulky
New! Self Starter
New!

"Paul Bunyan Brush Whacker"
for Right of Ways Land Clearing
Mows 5" brush 1-6 acres per day

MORE VERSATILITY

SHROUD AND BLADE
up to 48" width
grass - weeds - brush - leaf mulching - scarifying around posts - fences - trimming
SNOW PLOW - BULL DOZER
SNOW BLOWER. LOADER
SAWS - felling trees, cutting stumps at ground level and vertical cut
AGRICULTURAL ATTACHMENTS
PUMP
ELECTRIC GENERATOR for clippers, spraying electric chain saws, etc.
AIR COMPRESSOR

CAROLINA METAL PRODUCTS

2222 South Boulevard, Charlotte, N. C.

PROTECT YOUR CHILDREN WITH CAMPCO'S VACUUM-POWERED STOP SIGNAL!

CAMPCO





NOW BEING USED BY 24 STATES! For the Campco "Safety" Stop Signal offers all these features:

VACUUM POWER—The Campco signal is operated by vacuum power, a natural automotive power supply that is *always* instantly available. No wires to be crossed—no switches to fail.

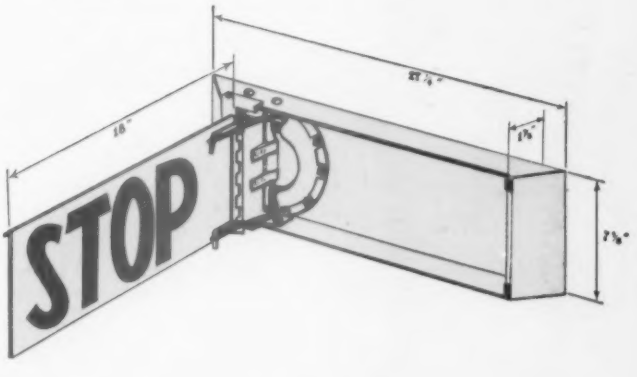
FINGER-TIP CONTROL—A valve close to the steering wheel moves to operating position at the flick of a finger. The driver doesn't move his eyes from the road for even one hazardous second.

CLEAR VISIBILITY—Whether used with or without rear lights, Campco's boldly-painted, wide-swinging "STOP" blade cannot be overlooked.

WEATHER PROTECTION—The STOP panel buries its face in its box, protected from weather and mud. When needed, it comes out clean to command a STOP!

PROVEN DURABILITY—Years of actual road service in many states has proved the durability of Campco Signals. Heavy sheet steel, protected with baked enamel, is used throughout. All moving parts are reinforced for long service.

SPECIFICATIONS: Kit includes stop signal completely assembled, with operating valve, tubing and all fittings necessary for installation. See diagram above for dimensions. STOP panel of 13 gauge and housing of 16 gauge cold rolled steel. Lifetime lubricated oilite bearings used in patented hinge construction. Operating valve supplied either with or without electric switch for simultaneous operation of both *Stop Signal* and *Stop Lights*. Unless otherwise specified, the word STOP is silk-screened on *both* sides of the blade. Special colors can be provided to meet the color requirements of any state.



School Bus Distributors can install the Campco signals on your buses, or supply you with complete kits for easy installation in your own County Garage. (New buses by virtually all manufacturers are already equipped with Campco signals.) Write for the name of your nearest distributor, and for Brochures 149 and 150, completely illustrating the Campco story.

SPECIFY VACUUM POWERED STOP SIGNALS
manufactured exclusively by

CAMPCO

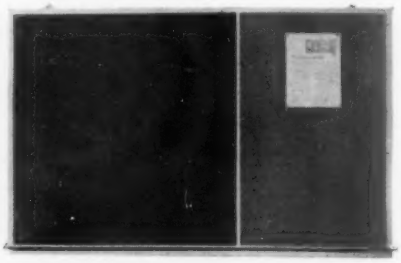
CAROLINA METAL PRODUCTS
2222 South Boulevard Charlotte, N. C.

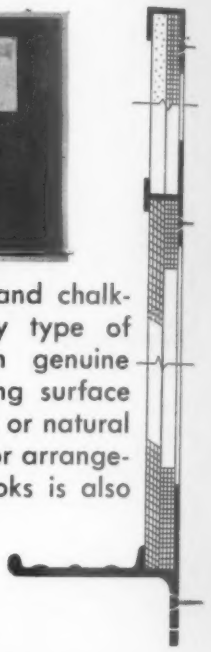
HERMAN G. BEHR CO.

11426 Schaefer Hwy., Detroit, Michigan

PREFABRICATED ALUMINUM FRAMED CORK & CHALKBOARDS







Our very finest bulletin and chalkboards! Perfect for any type of location. Furnished with genuine tan or green cork tacking surface mounted on sturdy masonite backing; the finest in green or black composition boards or natural slate if preferred; with a beautiful satin finished aluminum frame. Any combination or arrangement of cork and chalkboard is available. A maprail with cork insert and map hooks is also available as illustrated in photograph on the left.

These boards are also available with wood trim.



SWINGING PANEL BOARD

Both wall and floor models are available. Both sides of panels are usable:—natural corkboard surfaces in tan or green, or chalkboard surfaces in black or green, or a combination of the two. Will hold up to 10 leaves. Sizes 42" x 42" or 36" x 42".

CHAMPION SERIES BULLETIN BOARDS

CHAMPION SERIES bulletin boards are beautiful announcement or directory boards that will last a lifetime. See wall model illustrated at the bottom. These boards are widely specified by leading architects. May also be had for out-door use with or without aluminum posts.

CHAMPION boards have extruded, anodized aluminum frames, glass doors and either cork bulletin boards, or boards made with changeable letter insert. A wide choice of wall and floor models is available with or without fluorescent lights.





STYLE D PORTABLE CHALKBOARD

This is one of the most practical and useful portable chalkboards you can buy. It is ideal for school and classroom use. It is easily moved and can be instantly reversed for easy reference to either side. This board is available with two sides chalkboard, two sides corkboard, or one side of each. Furnished with genuine cork in tan or green and composition chalkboard in green or black. Frame and standards are strongly built of selected hardwood.

WRITE FOR THE BEHR CATALOGUE

These postcards are supplied for your convenience in securing catalogs or quotations without charge or obligation to you.

•

All requests will receive prompt attention.

•

AMERICAN SCHOOL AND UNIVERSITY

Catalog Service Dept.

Postage Will be Paid by Addressee

No Postage Stamp Necessary If Mailed in the United States

BUSINESS REPLY CARD

FIRST CLASS PERMIT No. 230 Sec. 34.9 P. L. & R., NEW YORK, N. Y.

American School & University,
470 Fourth Avenue,
New York 16, N. Y.

Postage Will be Paid by Addressee

No Postage Stamp Necessary If Mailed in the United States

BUSINESS REPLY CARD

FIRST CLASS PERMIT No. 230 Sec. 34.9 P. L. & R., NEW YORK, N. Y.

American School & University,
470 Fourth Avenue,
New York 16, N. Y.

Postage Will be Paid by Addressee

No Postage Stamp Necessary If Mailed in the United States

BUSINESS REPLY CARD

FIRST CLASS PERMIT No. 230 Sec. 34.9 P. L. & R., NEW YORK, N. Y.

American School & University,
470 Fourth Avenue,
New York 16, N. Y.

Postage Will be Paid by Addressee

No Postage Stamp Necessary If Mailed in the United States

BUSINESS REPLY CARD

FIRST CLASS PERMIT No. 230 Sec. 34.9 P. L. & R., NEW YORK, N. Y.

American School & University,
470 Fourth Avenue,
New York 16, N. Y.

I should like to receive catalogs and price lists on the following products:--

.....

.....

.....

.....

Name ..... (Title) .....

School .....

City ..... State .....

ASU 55-56

I should like to receive catalogs and price lists on the following products:--

.....

.....

.....

.....

Name ..... (Title) .....

School .....

City ..... State .....

ASU 55-56

I should like to receive catalogs and price lists on the following products:--

.....

.....

.....

.....

Name ..... (Title) .....

School .....

City ..... State .....

ASU 55-56

I should like to receive catalogs and price lists on the following products:--

.....

.....

.....

.....

Name ..... (Title) .....

School .....

City ..... State .....

ASU 55-56

These postcards are supplied for your convenience in securing catalogs or quotations without charge or obligation to you.

●

All requests will receive prompt attention.

●

AMERICAN SCHOOL AND UNIVERSITY

Catalog Service Dept.

KEARNEY & TRECKER CORPORATION

Milwaukee 14, Wisconsin

For Vocational Training...

NEW *Budget Priced*

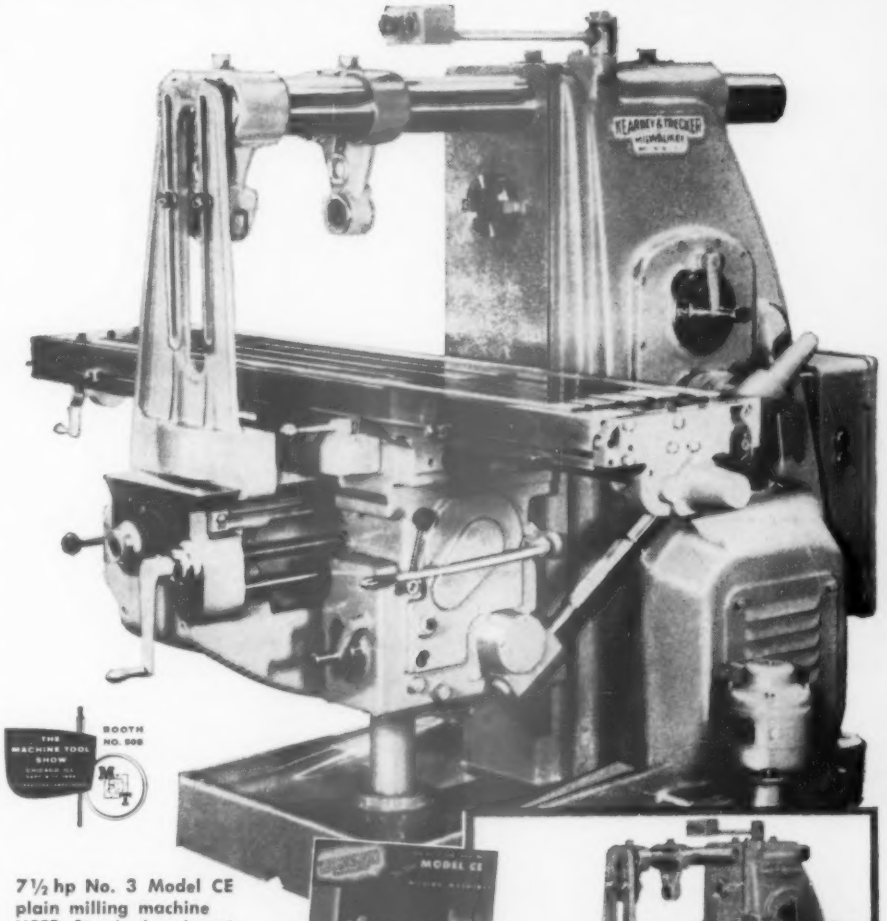
Plain and Universal Milling Machines

Kearney & Trecker announces the new Model CE 3 hp No. 2 and 7½ hp No. 3...especially suited to school shop needs

HERE'S Kearney & Trecker's answer to Education's need for a new milling machine that combines quality with *low cost*. The new Model CE's give you the three most wanted features—*Efficiency*, *Ease* and *Economy* of operation.

The economical Model CE's are available in either No. 2 (3hp) or No. 3 (7½hp) size — both in plain and universal styles. The CE's feature 16 quick-change speeds (25 to 1300 rpm) and feeds (½ to 25 imp). They are ideally suited for a wide variety of application — especially useful in operator training and demonstration of milling operations.

For the full story, contact your nearest Kearney & Trecker representative, or write Kearney & Trecker Corp., 6784 W. National Avenue, Milwaukee 14, Wisconsin.

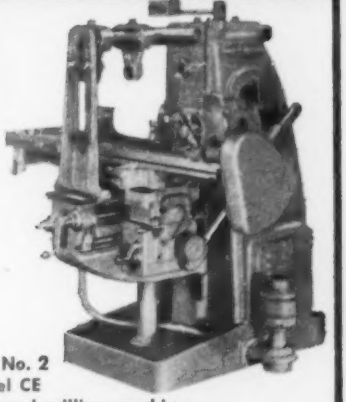


7½ hp No. 3 Model CE plain milling machine
NOTE: Standard equipment includes choice of only one arbor support. Overarm brace available at additional cost.



Free Catalog! Ask for complete data on Model CE milling machines, catalog No. CE-10. Also see our catalog in Sweet's Machine Tool File.

Visual Aids
More than 250 schools and colleges use Kearney & Trecker equipment and visual training aids. Aids are available at nominal or no cost to educational institutions. Write for details.



3 hp No. 2 Model CE universal milling machine
NOTE: Standard equipment includes choice of only one arbor support. Only Conventional Lead Attachment (shown above) is available in Model CE Universal machines. Overarm brace available at additional cost.



~~553 APR 30~~

AXELSON MANUFACTURING CO.

DIVISION OF U. S. INDUSTRIES, INC.

6061 South Boyle Avenue, Los Angeles 58, California

Axelson milling machines

Future die makers, machinists and supervisors can train in schools on the same machines used in industry.

Axelson Milling Machines are fast becoming favorites in tool rooms, pattern shops, schools and general manufacturing companies of all types. They are moderately priced for tools that possess the large capacity, high precision, and stability required to handle a large variety of milling, drilling, boring and grinding operations. In addition, a large variety of accessories and tools are available which will adapt tha machines to many classes of work.

Axelson bulletins and service manuals describe and illustrate the various parts of the machines and assist greatly in instructing new operators in the use of the machines as well as teaching the fundamentals of the design of milling machines.

Write for illustrated brochures with detailed specifications on the complete line of Axelson Milling Machines.

Axelson Manufacturing Co.

DIVISION OF U. S. INDUSTRIES, INC.
6061 South Boyle Avenue
Los Angeles 58, California

USI

Authorized dealers in principal industrial centers



Axelson Model 1½V Ram Type Vertical Milling Machine

This machine provides 22" from table top to spindle and possesses the weight and stability required to handle a wide variety of work with superior accuracy and speed of operation. The standard all-angle head may be powered with ¾, 1, or 1½ H.P. motor to supply 6, 8, 12 or 16 spindle speeds ranging from 50 to 6400 R.P.M. Tables are 9" x 36" with 22" longitudinal travel or optional 9" x 42" with 28" travel.

Bulletin No. 5503-M



Axelson Model 10R Ram Turret Vertical Milling Machine

This machine features extra large capacity and versatility for a machine in its price range. The unique turret slide provides a travel combined with the table of 38" which may be increased to 44" with optional table. The ram provides an in and out travel of 18". The "all-angle" feature is carried out to the fullest to permit an extremely wide range of machine operations.

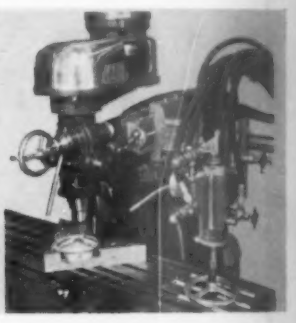
Bulletin No. 5501-M



Axelson Model 10RH Ram Turret Duplex Milling Machine

This machine offers horizontal and vertical milling with each spindle provided with individual motor drive and control. Horizontal spindle drive is by 1 H.P. motors and will provide 8 or 16 spindle speeds ranging from 55 to 3600 R.P.M. As a result, both vertical and horizontal milling practice can be taught on the one simple to operate machine.

Bulletin No. 5501-M



Axelson Hydraulic Duplicator Attachment

Hydraulic duplicator attachments may be supplied for all models of Axelson Milling Machines for making duplicate molds, dies, or for contour milling to template. The duplicator has a sensing tracer head that controls the movement of the table, knee and ram slide. Tracing units may include 1, 2, or 3 slide control units.

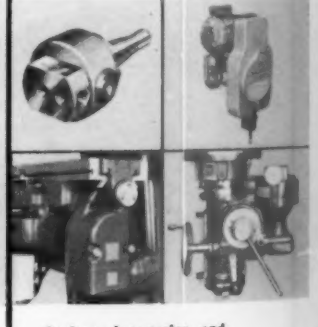
Bulletins Nos. 5501-M—5503-M



Axelson "All Angle" Milling Attachment

This attachment has a quill type spindle which is mounted on No. 7 precision angular contact bearings. It may be powered by ¾, 1, or 1½ H.P. and may provide 6, 8, 12 or 16 spindle speeds ranging from 50 to 6400 R.P.M. The head may be attached to other machine tools and may be operated at any angle. Patented planetary back gearing gives a 3 to 1 reduction providing extra low speeds for heavy milling operations.

Bulletin No. 5502-M



Axelson Accessories and Additional Equipment

A large variety of accessories and additional equipment is available which enables you to select the tooling required for many classes of work. This includes cutters, adapters, power table feed, power spindle feed, shaper attachment, dividing head, swivel base, rotary tables, and precision locating attachment, planetary back gear, offset boring head, etc.

Bulletin No. 5504-M

